the Iron Age
A Chilton Publication
THE NATIONAL METALWORKING WEEKLY • FEBRUARY 24, 1955

The outlook for machine tools
See page 39

NEW DEPARTURES OF TOMORROW

Today, New Departure ball bearings are used by 14 leading manufacturers of washers and driers. Wherever there's a moving part, New Departures assure accuracy, low upkeep, longer life.

Maybe it's hard to imagine a home laundry that washes, dries, irons, folds. But it's even harder to imagine this wonder—or any other—working without ball bearings . . . New Departures.

In fact, New Departure ball bearings play an important role in just about every product with moving parts. For more than 50 years, manufacturers everywhere have counted on New Departure for bearings.

Why this confidence? It's a matter of living up to a name. It means being *first* with new departures—like the Sealed-for-Life ball bearing. And New Departure will be ready tomorrow with the *finest* bearings . . . *first!*

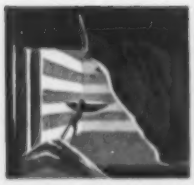
NEW DEPARTURE

DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

How much heat from a "heat" of Chromel?

You've seen molten metal before . . . but chances are you've never seen a "heat" that's more closely controlled as to composition and quality than the one you see above. For this is a heat of Hoskins Chromel . . . the *original* nickel-chromium alloy that *first* made electrical heating practical. Into it go precise amounts of the purest raw materials obtainable . . . mixed, melted, and poured in exactly timed cycles. And from it, ultimately, will come approximately 1200 pounds of fine finished material . . . smooth, bright, durable wire or ribbon produced to a specified resistivity for long, dependable service as heating elements or cold resistors in countless different electrical devices.

Chromel, however, is only one of many specialized, quality-controlled alloys developed and produced by Hoskins. Others include: Alloy 502 . . . used throughout industry for a wide range of heat resistant mechanical applications. Spark plug electrode alloys . . . which have become universally accepted standards of quality and durability. Alloy 717 . . . used in facing engine valves for longer life and improved service. And, of course, there are Hoskins Chromel-Alumel thermocouple alloys for industrial furnaces and jet engines . . . unconditionally guaranteed to register true temperature-e.m.f. values within close specified limits.



Heating elements made of Hoskins Chromel give long life service in industrial electric furnaces, home appliances.

Spark plugs equipped with Hoskins electrode alloys give long dependable service wherever they're used.

Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.

HOSKINS

MANUFACTURING COMPANY

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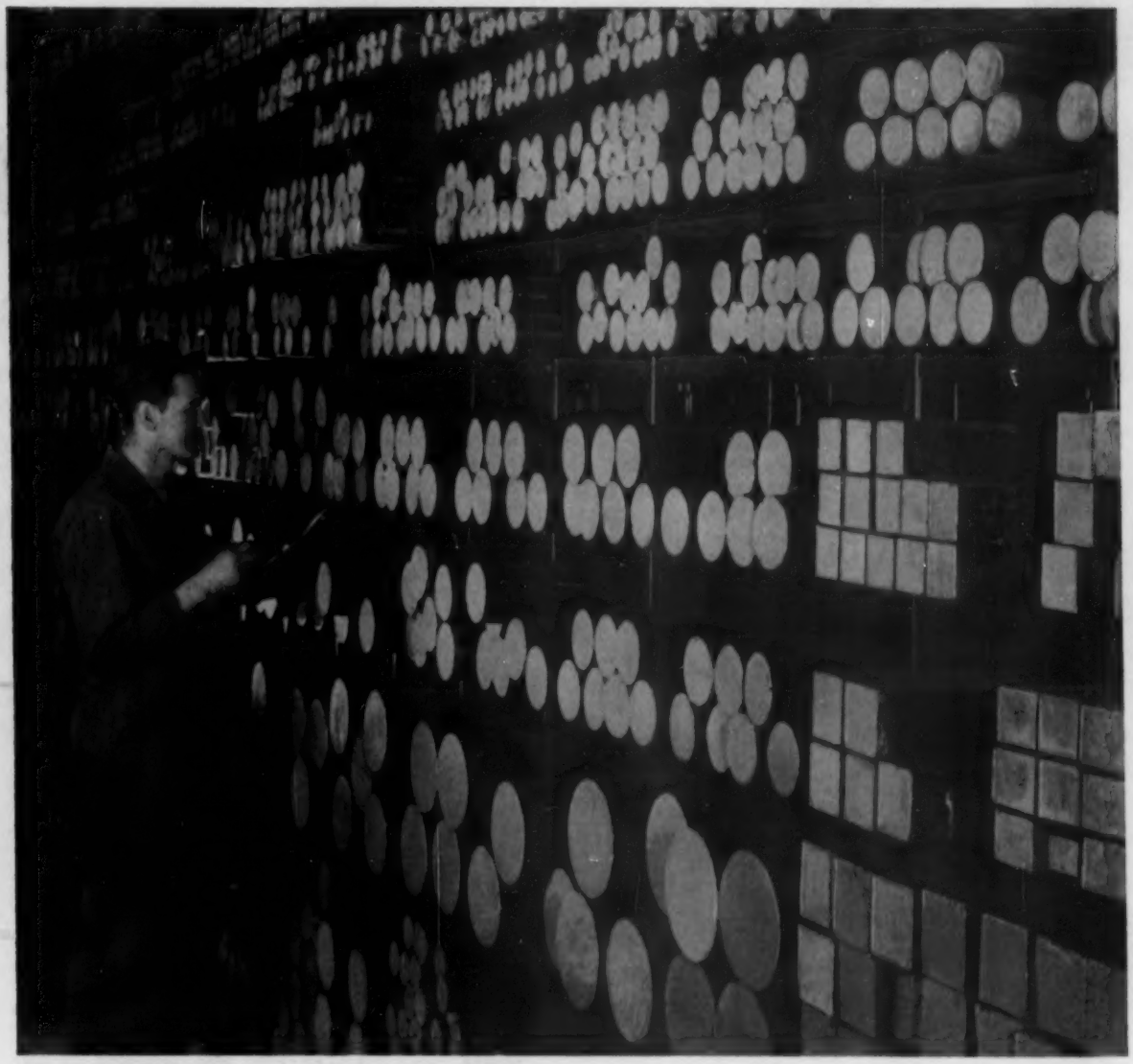
Chromel
NICKEL CHROMIUM WIRE



Want Fast Tool Steel Service?

SEE YOUR BETHLEHEM DISTRIBUTOR

Whether you want to order a short bar of tool steel, or merely wish advice about some phase of heat-treating, you're sure to find your Bethlehem tool steel distributor anxious to be of service.

Prompt service is your distributor's middle name. Why else does he make it a point to know your city like a book—its background, its people, its industry? He knows what steels you are most likely to need, and in what quantities. And so he keeps large stocks of Bethlehem tool steel on hand, in a variety of types, ready to go at a moment's notice.

If you want bars cut to special length, or if there's some tricky phase of metallurgy or any other tool steel problem troubling you, again your distributor is at your beck and call. He's a real friend. They don't come any better. It will pay you to get to know him.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

the Iron Age

Vol. 175, No. 8, February 24, 1955

DIGEST OF THE WEEK

Starred items are digested at the right

EDITORIAL
How's Your Industrial Couch? 7

NEWS OF INDUSTRY
*Special Report: Machine Tool Outlook Solid .. 39
*Labor: Will Steelworkers Ask A 32-Hour Week . 42
*Management: AMA Scans Labor Relations ... 44
*Raw Materials: How Steel Gets Its Water 45
*Production: Tinplate Makers Eye Capacity 46
*Government: Fifth Amendment Firings 47
*International: British Steel Hits New High 48
Industrial Briefs 54
Personnel: Iron Age Salutes 69
Iron Age Introduces 71
Clearing House 140

NEWS ANALYSIS
Newsfront 37
Report to Management 53
Automotive Assembly Line 56
This Week in Washington 61
*West Coast Report 64
Machine Tool High Spots 67

TECHNICAL ARTICLES
*Joints Brazed With New Nickel-Base Alloys ... 79
*Restore Surface Carbon During Annealing 83
*Proper Mount Design Aids Vibration Control ... 86
*Continuously Cast Wide Range of Alloy Steels 88
Big Extrusion Press Completed for Air Force ... 91
*Bar, Rod Feeds Boost Worker, Machine Output 92
Technical Briefs 104

MARKETS & PRICES
*The Iron Age Summary—Steel Outlook 119
*Steel Product Markets 120
Comparison of Prices 121
Iron and Steel Scrap Markets 122
*Nonferrous Markets 126
Steel Prices 129

REGULAR DEPARTMENTS
Dear Editor 9
Fatigue Cracks 11
Dates to Remember 13
Free Literature 96
New Equipment 111

INDEX OF ADVERTISERS 147

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NEWS DEVELOPMENTS

MACHINE TOOLS SOLID, BUT WON'T BOOM — P. 39

Tool builders expect a good year in '55—but it won't be a boom. New orders are expected to total some $600 to $700 million against $560.5 million last year and $861.8 million in '53. Shipments will dip to $700 or $800 million, reflecting the order decline in 1954. Armed Forces will buy more, automakers less. Salesmen will plug away at smaller plants with old tools. Tool show should help. Export picture not too bright; more firms plan overseas plants.

WILL STEELWORKERS ASK A 32-HOUR WEEK? — P. 42

Steel executives hope not, but many fear that a 32-hour workweek is coming in the industry. It's doubtful that the union will ask it this year—but USW officials are talking about it publicly. It's a cinch that when they do ask it, they'll also stump for the same take-home pay, meaning a 20-pct wage cost boost. And it'll be tied to the guaranteed annual wage. Starting point for overtime is a question.

MANAGEMENT LOOKS AT LABOR RELATIONS — P. 44

Chicago meeting of American Management Assn. highlighted by labor relations discussions. AFL-CIO merger seen as more than doubling labor's power. Expect more strikes, longer ones. Management must become more active in its labor relations.

WATER: HOW STEEL FILLS ITS REQUIREMENTS—P. 45

Industry must have water to function—and it must return the water to nature without contamination. Armco Steel gets 8 million gal per day from wells but needs 11 million. Firm building recirculation system which will also recover iron formerly wasted. How pollution is prevented.

COURT OKAYS FIFTH AMENDMENT DISCHARGES—P. 47

A Federal district court has upheld the action of General Electric in discharging employees who had invoked the Fifth Amendment in refusing to answer charges of Communist affiliation. The court ruled that individual rights were not violated and that the company was not obligated to negotiate with the union before setting up the discharge policy.

BRITISH STEEL INDUSTRY HITS NEW HIGH — P. 48

Demand continues strong after record output in '54. Import duties are lifted from more steel products. Expect steady progress. New construction will boost steel production another 5 pct this year.

IN METALWORKING

ENGINEERING & PRODUCTION

DISCUSS NEW NICKEL-BASE BRAZING ALLOYS — P. 79
Good mechanical properties and resistance to corrosion and oxidation are among the chief features of a new series of high-nickel brazing alloys. By alloying with the base material, they form a bond of exceptionally high strength. Some materials previously difficult to braze can now be joined easily. The alloys are made in rod, powder, wire, strip and washer forms.

SUB-CRITICAL AND OVER-CRITICAL ANNEAL — P. 83
Coils of cold forming and automatic machining stock are produced without surface decarburization in a controlled atmosphere, continuous annealing furnace. Only two basic furnace cycles are needed. One is a sub-critical anneal and produces an ideal structure for most cold forming work. The other is over-critical suitable for automatic machining.

MACHINERY MOUNTS AID VIBRATION CONTROL—P. 86
Vibration control is not achieved by merely slipping some kind of pad under the legs of machines. First it must be determined whether the problem is one of shock, vibration or both. Proper mount design is important to effective vibration control.

CONTINUOUSLY CAST WIDE RANGE OF ALLOYS—P. 88
Stainless, heat resisting, electrical and tool steels have all been successfully continuous cast in France. While production is limited to about 25 metric tons per day, the steels show mechanical properties which compare favorably with ingot cast steels. An oval cross section is used to obtain optimum soundness.

BAR AND ROD FEEDS BOOST MACHINE OUTPUT—P. 92
Efficient, automatic bar and rod feeders provide a constant supply of raw material for many machine operations. Modern units are controlled hydraulically, pneumatically, mechanically and electrically. Most applications are for screw machine and cutoff bandsaws.

MARKETS & PRICES

TINPLATE PRODUCERS EYE CAPACITY — P. 46
Steelmen are pondering the advisability of boosting electrolytic tinplate capacity. They set a record in '54 despite steel dip and may surpass it this year. Market is gaining as more things are put in cans and gaining population compounds the boost in demand. But possible threats to Far Eastern supply, attempts to find tin alternates, cloud the picture.

REINFORCED PLASTICS SHOW FAST GROWTH — P. 64
Reinforced plastic pipe is fast becoming a big industry on the West Coast. California firms did 25 pct of $400 million U. S. reinforced plastics business last year. Plastic pipe tonnage has grown six times larger since 1950, is expected to triple last years 30 million lbs in next 5 years.

STEEL ORDERS ARE HITTING NEW HIGHS — P. 119
Steel order volume this week reached a new high in the current movement. Many companies found new business exceeding capacity. Operations will move up to meet this bulge, may hit 95 pct soon.

BUYERS DIP INTO SHORT-TERM GRAY MARKET — P. 120
Those who deny the existence of a gray market in certain steel products are closing their eyes to the fact that some users are forced to pay above-mill prices to tide them over tight spots. Buyers have paid $5 to $10 over mill price for emergency tonnages of hot and cold-rolled sheets, enameling sheets. Quantities are small to date but they involve brokers and others who can operate at premium levels only when the market gets as tight as it is today.

ALUMINUM HITS ANOTHER OUTPUT RECORD — P. 126
January aluminum production started off a new record year with a bang—128,203 tons of the metal produced. And on top of this statistic comes the new 65,000-ton expansion of Alcoa's Texas smelters.

NEXT WEEK:

BUMPER LINE DEPOSITS QUALITY CHROME PLATE
Efficient, precise, dependable—best describe Oldsmobile's new high-production bumper plating line. It incorporates many devices to minimize handling to produce exceptional finishes. Each conveyor carrier can be routed to a particular destination by merely setting a dial. It meets no interference from other carriers. Racks remain fixed in cells during plating.

INVENTORY BUILDING WILL MAINTAIN STEEL DEMAND
Steel consumers are now paying penalty for overcautious inventory policy. Surge in steel demand caught many in short position. They are making some progress in rebuilding stocks but find the job more difficult due to own higher production level and competition from other users. Inventory-building may be big factor in sustaining steel production in last half.

FORD OF CANADA
BARREL PLATES AUTOMATICALLY IN
STEVENS AUTOMATIC BARREL Plating and Processing Machine

Tons of nuts, bolts, stampings, washers, screws and other small parts are automatically zinc plated in the modern Ford Motor Company of Canada, Ltd., plant every day. The machine that does the job is a Stevens Automatic Barrel Plating and Processing Machine.

In exactly 54 minutes a barrel makes the complete cycle of cleaning, acid dip, rinse and plating tanks, *automatically* empties the zinc plated parts and is ready to start the cycle again. Fifty-four similar barrels are continuously going through the same cycle.

There are hundreds of Stevens Automatic Barrel machines used by industry today. It is *proven* equipment. Management finds many cost saving advantages such as:

A uniform product • Less rejects • Minimum labor requirements • All operations controlled • An integral part of straight-line production • Low maintenance cost • Can easily meet future manufacturing changes • Processing flexibility • Lower cost of production per hour than any other method of processing • Lends itself to today's trend toward automation.

Are you plating your parts at the lowest possible cost? Check to see how Stevens Automatic Barrel Equipment can help you. Call your Stevens Sales Engineer or write direct.

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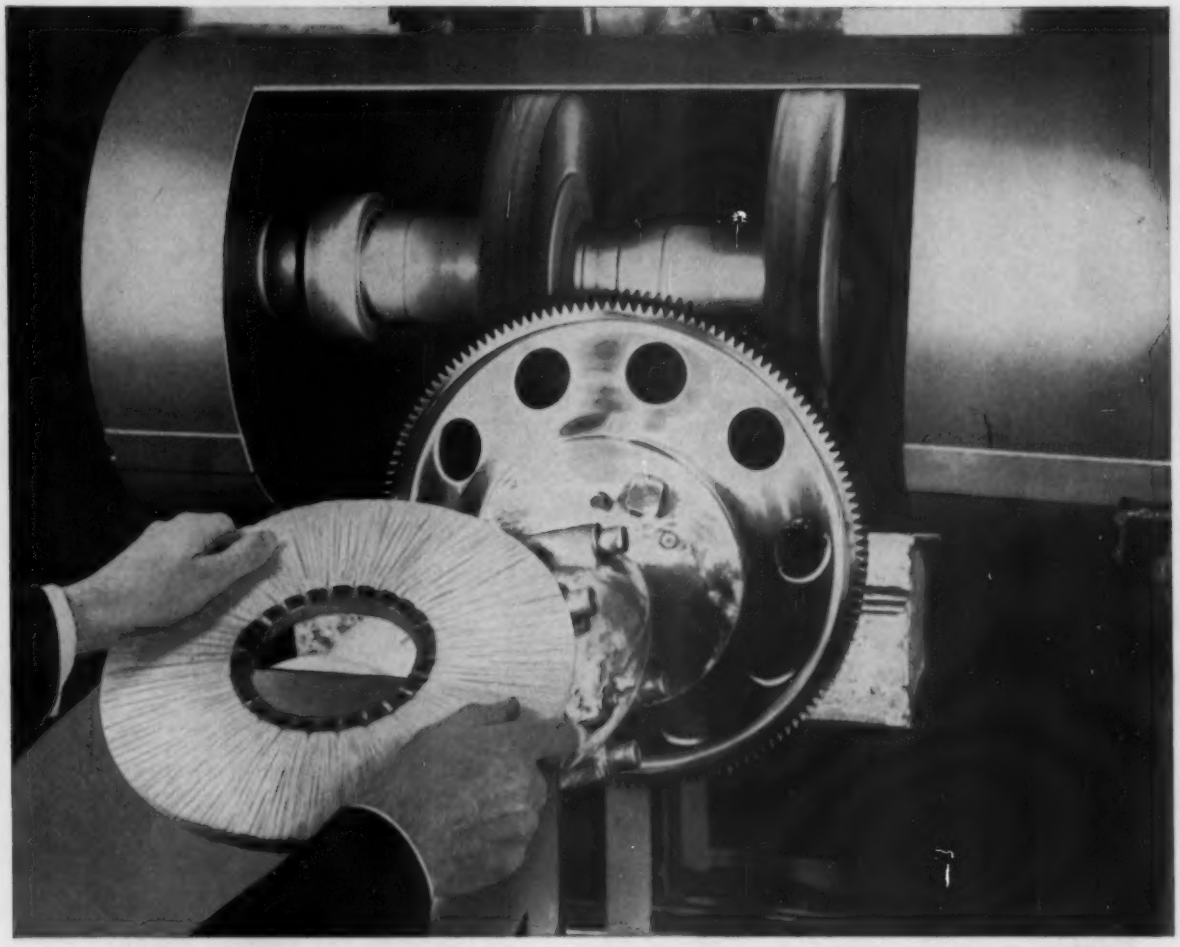

Push-button brushing beats handwork 15 to 2

PRODUCTION EFFICIENCY IS HIGHER. *Now it's easier to produce uniform finishes on many types of gears. Setup is simple . . . operations are done on preset time cycles to cut manufacturing costs.*

What manual operations could an OBA eliminate for you?

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(Advertisement)

What's New

IN STEEL FROM STOCK

In the news today are many developments of interest to those who specify, buy or work with steel. Ways in which you can raise efficiency and lower costs in your operations may be suggested by the following summary.

7½¢ per lb. saving on stainless sheets. Rising nickel prices are bringing back Type 430 straight-chrome stainless for mild corrosion applications. 7½c price advantage is real inducement and Type 430 may also be getting consideration as insurance against any shortage of nickel-bearing types. Ryerson has anticipated renewed demand by stocking Type 430 sheets in many gauges and sizes. Technical data on request.

Low carbon plates for easy forming and welding. If you've had trouble forming or welding carbon steel plates remember—steel produced to most popular warehouse plate spec. (ASTM A7) may have up to .35% carbon. To meet this problem, Ryerson now carries plates (⅜" and lighter) produced to low carbon spec. especially for good forming and welding qualities. Also on hand: more sizes—more tonnage of carbon steel bars, shapes and sheets.

Revolutionary reduction in shop costs brought about by Ryerson's New Rycut 50 is the most important news to hit the alloy steel market in years. With this new .50 carbon leaded alloy, reductions in finished part costs of 25% or more are commonplace. Machining time is often reduced as much as 75% . . . tool life extended from 100% to 300% and production increased as much as 200%—all without known loss in mechanical properties as compared with standard alloys in the same carbon range.

A leaded alloy for every application is now available in the Ryerson Rycut series. Any one of them will typically cut your costs on machined parts by 25% or more. Use Rycut 20 when you need a carburizing alloy. Use Rycut 40 when you need a .40 carbon alloy, and New Rycut 50 for .50 carbon alloy applications. Also on hand in a growing range of sizes: leaded carbon-manganese bars—low carbon, suitable for case hardening, unusually fast machining.

New Ryerson stainless solves welding problems. Both stainless sheets and stainless plates in Type 304 L and Type 316 L have recently been added to the nation's largest stainless stocks—at Ryerson. In applications involving welding and stress relieving, where carbide precipitation may occur, these extra-low-carbon stainless steels can often replace expensive stabilized types.

Save 30% with Type 302 ornamental stainless tubing. Another recent addition to Ryerson stocks, this tubing is priced substantially below comparable stainless tubing for other than ornamental purposes. Yet it is more than satisfactory for many applications such as in restaurant and hospital equipment, etc.

Same day deliveries . . . tighter quality control. On as high as 98% of all regular warehouse orders, Ryerson is now cutting and shipping steel the same or following day. And this steel is now protected by a whole new set of quality control standards. As evidence—we can furnish a certificate of analysis or a mechanical properties report for every pound of steel shipped.

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Indexed in the Industrial Arts Index and the Engineering Index.

ABP NBP

Editorial:

How Is Your Industrial Couch?

WHILE we decide whether or not the Reds are to get away with murder we have other fish to fry. The name of this new stuff is called "motivation."

In simple English, "motivation" means finding out what people want secretly and then setting up a sales pitch which will exploit this to the utmost. What people want secretly is not always what they think they want.

The new plan is to get people on your industrial couch and delve into their unconscious desires and phobias. This way makers of machinery, things and gadgets may find means of overcoming sales resistance.

Take automobiles. The 1955 models are lulus. Most people look at them as more for the money, better looking, more power, longer and luscious. But motivation plays its part. Here's the way it works:

(1) Millions of 1955 cars will be sold because a man has replaced his wife with a car in his affection. Many of these men are in love with the beauty and the lines of the new models. They secretly love the new colors which are made socially acceptable because they are on the automobiles.

(2) There are untold hundreds of thousands of men who are henpecked. Many know it, few admit it. The new automobile is a companion who never harangues, talks back, or is generally disagreeable. Sales are made because of this unconscious desire to find a loyal and silent companion.

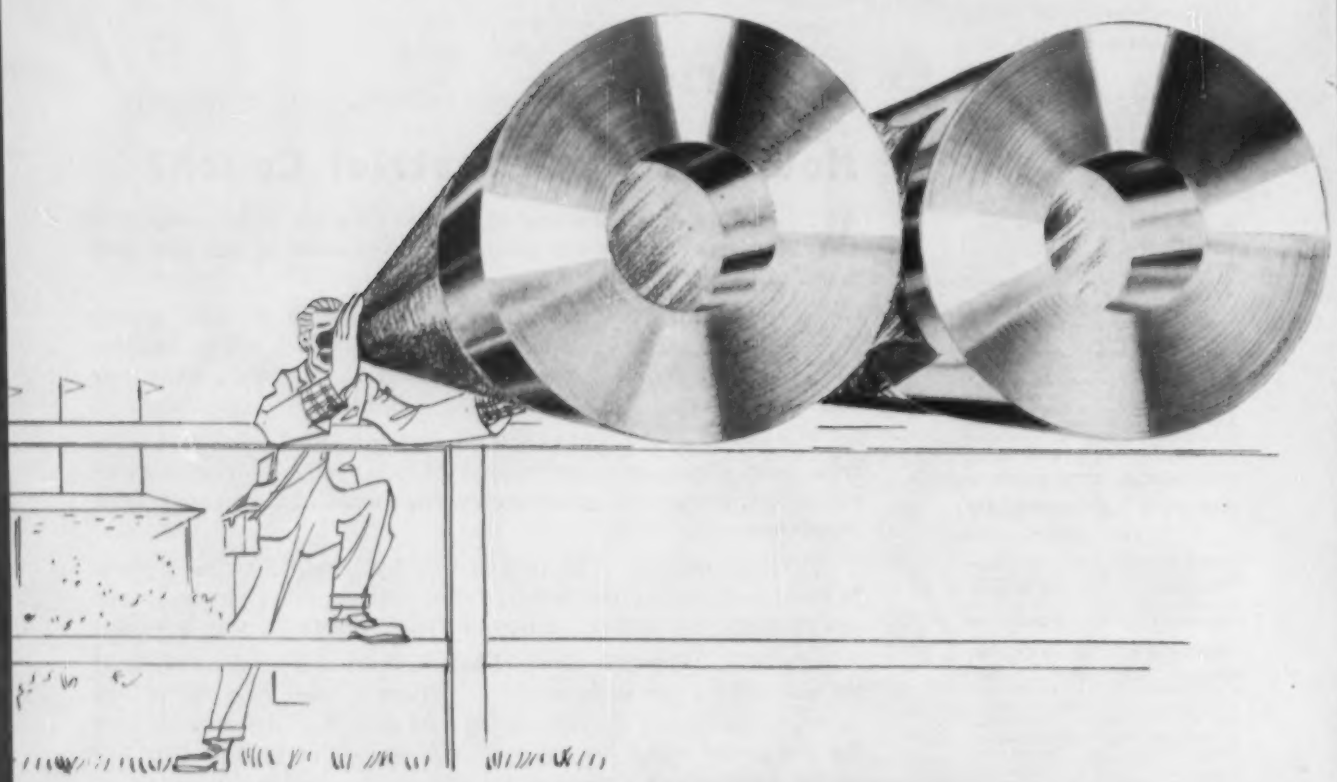
(3) Then there is the power complex. A man may have little or no authority at home or in the office. But by buying one of the big new type high horsepower cars he has all the power he wants at his command. He may not need it but he knows he has it. This satisfies a power motivation which may be otherwise frustrated.

Machinery makers might well consider color, unusual design, illuminated bulletin boards (as part of machinery), specially designed handles, and anything your plant psychologist can suggest. This is just a starter. You are bound to find unlimited horizons when you get into motivation. It's a lot of fun and you play with dynamite.

Tom Campbell

EDITOR

BETTER LOOKING



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dear editor: *letters from readers*

Metal Finishing

Sir:

In your Jan. 27 issue, in the Newsfront section, you have a paragraph about a new coating entitled "Protects Fine Metal Finishes." We would appreciate your advising us where we can obtain more information relative to this coating.

In the same section you mentioned a cold extrusion progress report, which relates to a $7 million Army Ordnance contract for a special shell by the cold extrusion process. We are very interested in this also, inasmuch as we are making a 105-mm shell by the cold extrusion process. Will you please advise where we may get more information on this progress report? *W. E. LaVette, Asst. Purchasing Agent, Procurement Research, Geo. D. Roper Corp., Rockford, Ill.*

Details on the new coating for protecting metal finishes may be obtained from the H. A. Montgomery Co., 17191 Swift Ave., Detroit, Mich.

Further information on the cold extrusion progress report may be obtained from Mullins Mfg. Co., Salem, Ohio.—Ed.

Die Casting

Sir:

We are quite interested in the article "Die Castings, Beauty in Finish" which appeared on p. 134 of the Dec. 16, 1954, issue, and would appreciate the additional information available. *H. J. McCarthy, Purchasing Agent, Parker White-Metal Co., Erie, Pa.*

The Alumilite finishes were developed by The Aluminum Co. of America, Alcoa Building, Pittsburgh 19, Pa. We suggest you contact them for further information.—Ed.

The Arctic

Sir:

I have read the technical article entitled "Arctic Regions Pose Tough Metallurgical Problems" by Maj. F. W. Myers, Jr., U. S. Army on the effects of subzero temperatures on Army equipment used in Arctic regions. His exposition contains some valuable information. Please send me a copy of the article. *A. V. Alessandria, Research Dept., Foster Wheeler Corp., New York, N. Y.*

Ultrasonics

Sir:

The June 24, 1954, issue of your magazine carries an article entitled, "Ultrasonics Improve Soldered Joints in Aluminum." If you have two reprints of this article available, we would like to receive them. *R. E. Brings, Engineering Research Associates, Div. of Remington Rand, Inc., St. Paul, Minn.*

Ductile Iron Tubing

Sir:

In THE IRON AGE, Dec. 16, p. 69, appears the item "Tubing Produced from Ductile Iron." Is there any further information available? *Daphne Drake, Technical Librarian, The British Cast Iron Research Association, Alvechurch, Birmingham, England.*

Details on this tubing may be obtained from International Nickel Co., 47 Wall St., New York, N. Y.—Ed.

Uranium

Sir:

We would like to have six copies of the article "What is Behind the Uranium Boom," pp. 34-36, of the Jan. 27 issue. *H. J. Landahl, Pacific American Steel Iron Corp., Portland, Oregon.*

West Coast Report

Sir:

We would appreciate having a tear sheet of p. 65 of your Jan. 20 issue entitled "West Coast Report." We would like to forward this to our western sales representative. *L. A. Welt, President, Steel City Testing Machines, Inc., Detroit.*

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Traveloader replaces 3 trucks and releases 6 men for other work

● A Traveloader is used by Kyle-Taylor Lumber Company, Berwick, La., to transport pipe from river dock to storage. It has replaced two pipe trailers and a gin-pole truck formerly used on this job, reduced man-power required from 15 to 9 and made time savings of about 70%.

This company, serving oil producers, receives pipe in barges at the river dock. A truck crane unloads and places the pipe on the dock. The Traveloader picks it up five lengths at a time, transports it to the storage yard, and stacks it neatly on racks for further disposition.

Time studies reveal the speed with which Traveloader works. Loading time at dock averages 35 seconds. Hauling to storage, stacking and returning to dock (round trip .55 miles) averages 3 minutes 8 seconds. The stacking part of this operation takes only 24 seconds! As a result the crane at the dock never has to wait for the Traveloader.

Since the company operates 24 hours, 7 days per week, the cost savings are substantial. Moreover, 6 more workers were made available without increasing payroll, and two less mechanized units require maintenance. "This machine is by far the finest that I have seen for handling pipe. It has doubled our capacity with less labor," says Mr. J. E. Kyle, Jr., Vice President.

Write for Bulletin 1360. It completely describes the remarkable TRAVELOADER that carries like a straddle truck, delivers like a road truck, and stacks like a fork truck. The Baker-Raulang Company, 1227 West 80th Street, Cleveland 2, Ohio.

Baker.
industrial trucks

fatigue cracks

by William M. Coffey

How to Get $500—Easy!

The race is still wide open for that $500 jackpot prize to whomsoever can produce the oldest issue of THE IRON AGE. Many entries have been entried, but we're certain there must be some older ones around—and you may well have it. Won't tell you what dates have been submitted so far, but from the oldest here are a few clues. This is the one you have to beat! It advertises Burden's Horse Shoes . . . gives Detroit a pat on the back for having 422 manufactories with a capital of $13,250,000, whose products aggregate $20,182,375 and which employed 11,116 hands (a real giant) . . . prices copper at 23½¢ per lb (Feb. 17, 1955 IRON AGE puts copper at 33¢), foundry iron at $25 to $26 per ton (now $58.88 to $61.19) and tin at 20¢ to 21½¢ per lb payable in gold (IRON AGE now says 90¢, payable in any old kind of money).

So there you are. Find out the year these things were true and you know what date you have to beat.

One point that may be confusing. From 1855, our founder's day, to 1859 we were known as "The Hardwareman's Newspaper." The title was changed to THE IRON AGE in 1859. So keep a weather eye peeled for both titles. If you find "The Hardwareman's Newspaper" you could very well have the winner—and $500.

Short reminder on rules and procedures. $100 will be paid for the copy with the second oldest dateline; for all other issues submitted between 1855 and 1900, a copy of the centennial issue of THE IRON AGE, "100 Years of Metalworking," to be published in June 1955, will be awarded. Do not send original copy, just photostat or photograph showing dateline. Finders of award winning entries will be required to give these issues to THE IRON AGE. Employees of the Chilton Company, THE IRON AGE, The Hardwareman's Newspaper or their advertising agencies are ineligible. We have to make money some other way.

Book Reviews

Your government in Washington has released some new titles. Curl up with these: **Lespedezas For Quail And Good Land Use**—meets demand for information on the lespedezas.

Rounded Corner Hutch For Rabbits—the labor connected with raising rabbits consists largely in feeding and watering the animals daily, and in cleaning the hutches. The design of the hutch makes a great difference in the amount of labor involved. Rounded hutches, get it?

Puzzlers

The volume common to all three cylinders (Jan. 13 puzzler) is 4.686288 according to Mr. P. A. Smith, Winchester Repeating Arms, and he should know because he persed the problem. Winners: C. W. McKinley, who hasn't dropped one in many a week, Ira Blumenthal (close enough, Ira), Lou Dodd, I. M. Darcey and Ole Ray Robinson.

New Puzzler

Mr. Henry M. Hall of Pioneer Steel Ball, Inc., Unionville, Conn., has kindly sent us this one: An isosceles triangle has 80° base angles. From the left-hand base angle a line is drawn to the opposite side, making a 50° angle with the base. From the other base angle a line is drawn to its opposite side, making a 60° angle with the base. The points of intersection of these lines with the triangle legs are joined. The problem is to determine the sides and angles of this last triangle, the smallest one. The isosceles triangle base is 3.00.

now you can produce trouble-free,

FREE-MACHINING STEEL with FOOTE MANGANESE SULPHIDE

This fume-free ladle additive increases quality and reduces the cost of producing high sulphur, free-machining steels . . . with these plus advantages:

1. *improved hot rolling behavior*
2. *fewer surface defects*
3. *fewer diversions*
4. *lower conditioning costs*
5. *low carbon content saves heat time*

TYPICAL ANALYSIS

Manganese	53%
Sulphur	32%
Carbon	.22%

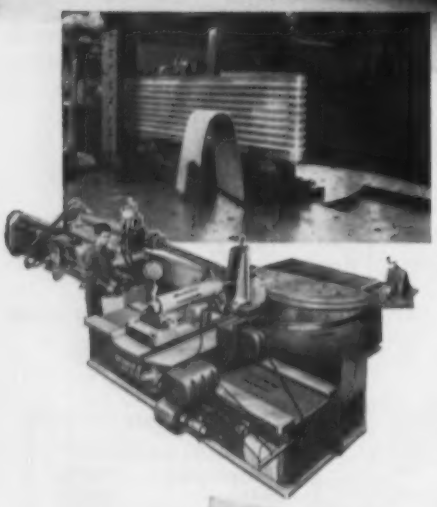
Size: 1" x 5" lump

write for further details!

Foote MINERAL COMPANY

438 Eighteen W. Chelten Bldg.
Philadelphia 44, Pa.

HEAT DEFLECTION...
...at 2000 M.P.H.



The newest approach to the problem of the phenomenal heat generated at high speeds, known today as the THERMAL BARRIER, is to deflect the heat from the pilot and vital parts of the plane.

Photograph to the left shows the deflecting, or corrugated sheets being formed on a BATH Stretch Forming machine. These particular corrugated sheets are for leading wing-edge construction.

Catalogs describing BATH Stretch Forming, Compression Forming, Radial Draw Forming, or Contract Forming are available for the asking...

THE CYRIL BATH COMPANY

32330 AURORA ROAD • SOLON, OHIO
(LOCATED IN THE GREATER CLEVELAND AREA)

MANUFACTURERS OF RADIAL DRAW FORMERS • DIES • TOOLS • PRESS BRAKES • TANGENT BENDING SEQUENCE PRESSES • PRESS TYPE BRAKES • SPECIAL MACHINES

dates to remember

MARCH

PORCELAIN ENAMEL INSTITUTE — Pacific Coast conference, Mar. 10-11, Biltmore Hotel, Los Angeles. Institute headquarters are at Dupont Circle Bldg., 1346 Connecticut Ave., N. W., Washington, D. C.

STEEL FOUNDERS' SOCIETY OF AMERICA—Annual meeting, Mar. 14-15, Drake Hotel, Chicago. Society headquarters are at 920 Midland Bldg., Cleveland.

AMERICAN SOCIETY OF TOOL ENGINEERS—Annual meeting, Mar. 14-18, Shrine Auditorium and Exposition Hall, Los Angeles. Society headquarters are at 10700 Puritan Ave., Detroit.

EXPOSITIONS

NATIONAL ASSN. OF CORROSION ENGINEERS—Annual meeting and Show, Mar. 7-11, Palmer House, Chicago. Association headquarters are at 1061 M & M Bldg., Houston.

AMERICAN SOCIETY FOR METALS—Western Metal Exposition and Congress, Mar. 28-Apr. 1, Pan Pacific Auditorium, Los Angeles. Society headquarters are at 7201 Euclid Ave., Cleveland.

NATIONAL MACHINE TOOL BUILDERS' ASSN.—Machine Tool Show, Sept. 6-17, International Amphitheatre, Chicago. Association headquarters are at 2071 E. 102nd St., Cleveland.

NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—Annual convention, Mar. 20-22, The Conrad Hilton Hotel, Chicago. Association headquarters are at 271 Madison Ave., New York.

INTERNATIONAL ACETYLENE ASSN. —Annual spring convention, Mar. 22-24, Shamrock Hotel, Houston. Association headquarters are at 30 E. 42nd St., New York.

AMERICAN HOT DIP GALVANIZERS ASSN., INC. — Annual meeting, Mar. 24-25, Brown Hotel, Louisville. Association headquarters are at 1506 First National Bank Bldg., Pittsburgh.

AMERICAN MACHINE TOOL DISTRIBUTORS ASSN.—Spring meeting, Mar. 25-26, The Greenbrier, White Sulphur Springs, West Va. Association headquarters are at 1900 Arch St., Philadelphia.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Annual meeting, Mar. 29-31, Biltmore Hotel, Palm Beach, Fla. Institute headquarters are at 600 Fifth Ave., New York.

APRIL

AMERICAN HARDWARE MANUFACTURERS ASSN.—Spring meeting, Apr. 10-14, Palm Beach, Fla. Association headquarters are at 342 Madison Ave., New York.

WIRE REINFORCEMENT INSTITUTE INC. — Spring meeting, Apr. 11, The Greenbrier Hotel, White Sulphur Springs, W. Va Institute headquarters are at National Press Bldg., Washington, D. C.

CONCRETE REINFORCING STEEL INSTITUTE—Annual meeting, Apr. 11-16, The Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are at 38 S. Dearborn St., Chicago.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS — Annual meeting and exhibit, Apr. 13-15, Sherman Hotel, Chicago. Society headquarters are at 84 E. Randolph St., Chicago.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS — Organization anniversary meeting, Apr. 16, Hoboken, N. J. Society headquarters are at 29 W. 39th St., New York.

Five-Year Record of PRODUCTIVITY in

North Carolina

Convincing evidence of North Carolina's advantages for industry, with a good indication of the workers' abilities in the metalworking field, is summarized in this statement contained in the 1953 Annual Report of SACO-LOWELL SHOPS, about its plant in this State:

"By all measures of performance the acquisition of this plant in 1948 has been completely justified; it has met every requirement established both for the quantity and the quality of its production."

The growth of this North Carolina plant is described in these words:

"The first textile machine to be made in Sanford was the Comber, manufacture of which was commenced late in 1948. In the next year the production of lap winders, continuous strippers, and sliver testers was allocated to Sanford, and the number of employees increased to 270. The production of these four machines was so satisfactory that in 1950 the manufacture of drawing frames was transferred to this plant and an addition of 16,600 square feet was built to take care of the increased volume of business."

Other companies, too—big names and new names—have chosen North Carolina for the many reasons which have made it the South's leading industrial State.

For specific information or a copy of the general industrial brochure, just write, wire or phone Ben E. Douglas, Director. Department of Conservation and Development, Raleigh, 11, N. C.

The 48-page booklet "NORTH CAROLINA STORY" describes the State's industrial diversity in a chapter "From Aircraft to Zippers". Write for a copy.

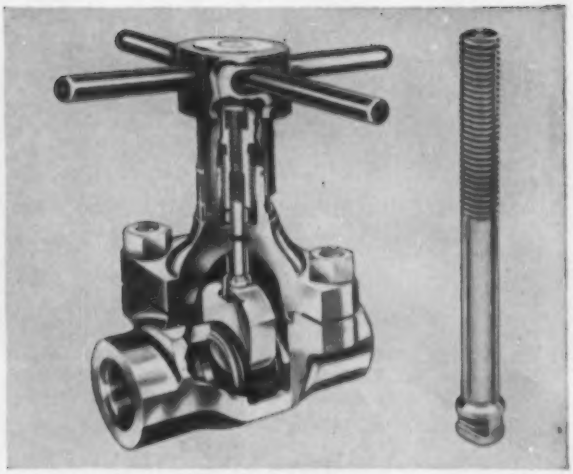
Friendly North Carolina
Where Industry Prospers

Will you be standing in your

COMPETITION'S SALES SHADOW?

COSTS ARE CUT ON UNDERWOOD CALCULATING MACHINES by using ELECTRUNITE Stainless Steel Tubing for the cylinder in the carriage shock absorber. This part must have a suitable finish to reduce drag, also accurate bore, little diameter variation and negligible eccentricity. Underwood reports good service life plus a saving of 75 cents on material costs for each shock absorber.

YOU HAVE SMOOTHER, MORE ECONOMICAL MATERIALS HANDLING with Republic Wedge-Lock Long Parts Storage Units, developed by Republic's Berger Division. Items can be stacked unusually high with less danger of sway, sag or buckling, because joints are designed to support tremendous loads. Exclusive Wedge-Lock joint actually becomes tighter as weight increases.



MAKE DUPLICATE STAINLESS STEEL PARTS ECONOMICALLY when you use Enduro Stainless Steel Cold Drawn Bars. Edward Valves, Inc., East Chicago, Ind., uses Enduro Cold Drawn types 410 and 416 on its MUDWONDER valve for oil-field use. Edward engineers report high feeds and speeds can be used; excellent surface finish; longer tool life; less down-time for regrinding.

The sales figures may not show it now. But a month, six months, a year—and they might not look so good. Then, what will you do?

We suggest one thing: look into Republic Enduro Stainless Steel.

We know that making a product out of Enduro Stainless Steel can often put a silver lining in a sales picture. And we at Republic will be glad to help you.

We've been making stainless steels for more than thirty years. We pioneered many of their uses. We developed many alloys ourselves. And we know how to put them where they will do the most good.

Why not talk things over *before* your competition casts a shadow? Then we can keep your product out in the sunlight. Right where customers can buy it.

And will want to buy it.

Call your nearest Republic District Sales Office. Or send in the coupon for more information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
3104 East 45th Street, Cleveland 27, Ohio

Please send more information on:

☐ Enduro Stainless Steels ☐ Stainless Steel Tubing & Pipe
☐ Berger Wedge-Lock Long Parts Storage Units

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City_____ Zone____ State_____

K-1000

spot the champ

. . . and with high speed steels

the champion's always REX

Compare the freckles and you'll pick the champ. And it's easy to spot the champ in high speed steels, too, for Crucible REX® has been the *standard of comparison* for over half a century.

Prove the reasons for REX's superiority in your own shop. You'll like its hardenability. . . response to heat treatment . . . fine tool performance. Like thousands of other users, you'll agree *you can't find a high speed steel to outperform REX.*

Ask for REX, a *prescription-made* Crucible product, at Crucible warehouses or leading distributors from coast to coast. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Production Pointers from GISHOLT

GISHOLT TIME-SAVING IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your own work.

SHORT STROKES ON IDLE STATIONS PAY OFF WITH LONG SAVINGS

This Fastermatic Feature Saves both Cycle Time and Changeover Time

Here, the Gisholt 2F Fastermatic Automatic Turret Lathe is fully tooled for *both* machining operations on these steel gear forgings. For the first operation, tools on hexagon turret stations 1, 2, 4 and 5 are used. Tools on the front and rear cross slides face and chamfer.

When first operation machining on a lot is completed, tools already on hexagon turret stations 3 and 6 are ready for the second operation. This is possible because of the short stroke cam arrangement, a standard Fastermatic feature, which reduces travel of the hexagon turret saddle. This moves forward only far enough on idle stations to reset the indexing mechanism, saving 4.2 seconds per station.

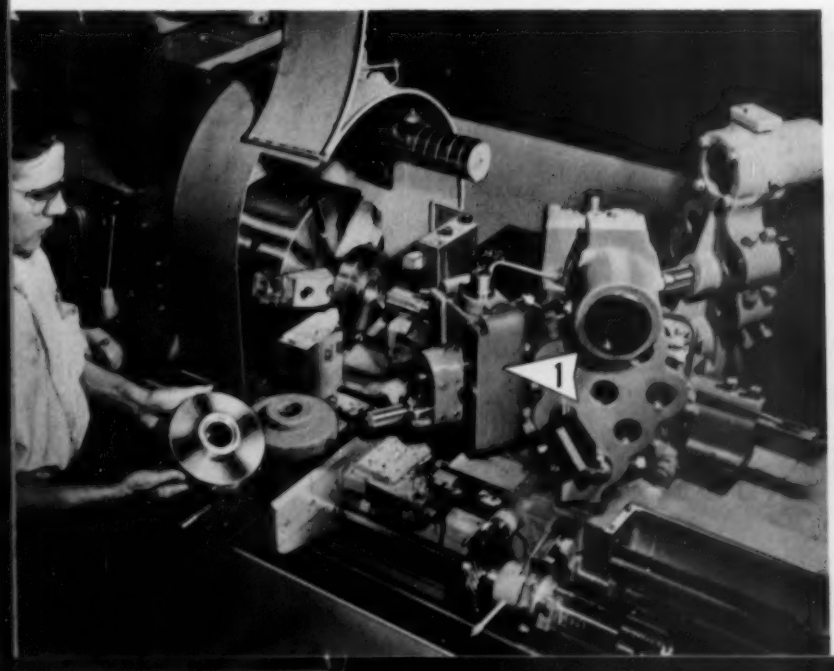
Changeover is a push-over

For the second operation, the short stroke cams operate on hexagon turret stations 1, 2, 4 and 5. Front and rear cross slide tools are changed. The chuck gets soft jaws which are bored and faced "in place" from hexagon turret station 6.

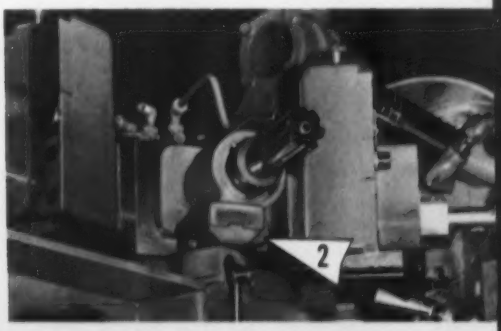
Tools on hexagon turret stations 3 and 6 and on the cross slides complete the part. Time for first operation is 3.30 minutes f.t.f., and for the second, only 1.39 minutes.

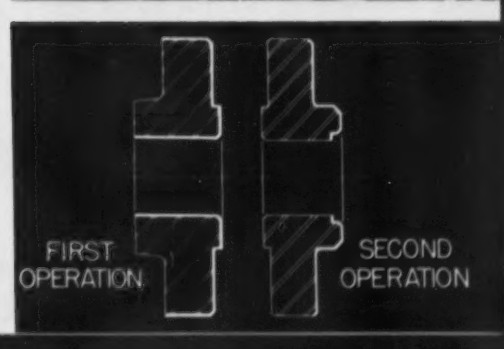
The standard short stroke arrangement reduces traverse time on all idle stations, and permits leaving second operation tooling in place on the hex turret for jobs like this.

1st operation setup. Operator holds second operation part. Adjustable boring head (1) bores and faces soft jaws "in place" and also chamfers co-bore in second operation.



To short stroke tooling on hexagon turret station facing the spindle, operating cam (2) is added. Cam is interchangeable and usable at any station.





GISHOLT

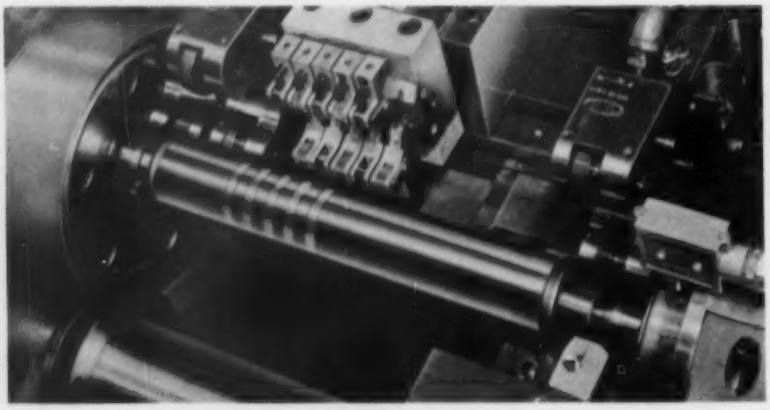
TIME-SAVING IDEAS

NOW IS THE TIME...

15 SECONDS PER PART...INCLUDING THREADS

High Speed Setup for 6 sizes of grease gun barrels on Hydraulic Automatic Lathe

Setup for producing grease gun barrels shown above.



This is more than a problem of speed. Careful holding and driving are imperative. The material being worked is thin-wall welded sheet tubing.

Production is handled on this one Gisholt No. 12 Hydraulic Automatic Lathe. To avoid distorting, the parts are internally supported by bushings at both ends for forming and threading. A tailstock-supported expanding mandrel drives and also equalizes chucking pressure and supports where knurling is done.

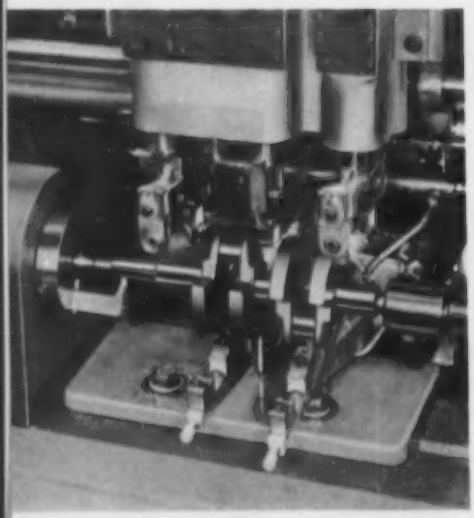
Tools on the front carriage turn the right end and form an oil seal. Tools on the rear independent slide roll the threads at both ends and perform knurling. Because knurling is done on the four larger sizes only, the knurling tool block flips back out of the way for the other two sizes.

Production is at a rate of 192 parts per hour at 80% efficiency. Workpieces range from 5" to 15" in length.

The simpler loading and faster machining provided by the No. 12 Automatic Lathe make it possible to produce 4 parts per minute.

60% MORE PRODUCTION WITH 2-IN-1 SUPERFINISHING

Crankshaft main & pin bearings Superfinished at once



All bearing surfaces are Superfinished at once with this double-tooled Superfinisher. All crankshafts shown at right are done on this one machine.

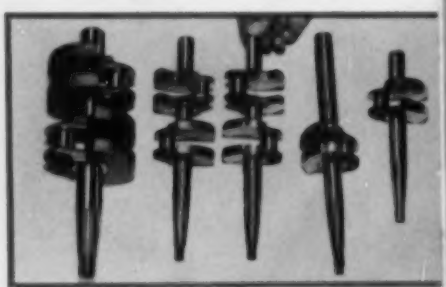
By keeping abreast of new developments, West Bend Aluminum Company, Hartford, Wisconsin, now Superfinishes outboard motor crankshafts 60% faster than before. This Gisholt Model 51A Superfinisher is tooled to Superfinish simultaneously both main and pin bearings on a variety of crankshafts.

With the workpiece loaded, the operator attaches follower-type stoneholder arms to the pin bearings. Pressing a button starts the cycle.

Two, three or four stone-carrying quills Superfinish the main bearing surfaces while the follower-type stoneholder arms do the pin bearings.

Time is only 35 seconds f.t.f. and bearing surfaces are Superfinished from 30 to 40 micro-inches down to 10 to 15 micro-inches RMS. This *controlled* 10 to 15 micro-inch "frosty" finish holds oil and eliminates the need for "breaking in" bearing surfaces. Grinding marks are removed and all amorphous smear metal scrubbed away.

In this interesting setup, both main and pin bearings are Superfinished in one operation, thus saving time and money to produce a product that performs better, lasts longer.



Superfinish has made great strides in the past few years. This and many other interesting jobs a[illegible] shown in the new Superfinish catalog, form No. 1169. Write for your copy.

GISHOLT

LOOK AHEAD... KEEP AHEAD... WITH GISHOLT

FOR MODERNIZING MACHINE TOOLS

GISHOLT

TIME-SAVING IDEAS

HOW TO MACHINE CAST IRON AND STEEL AT SAME TIME

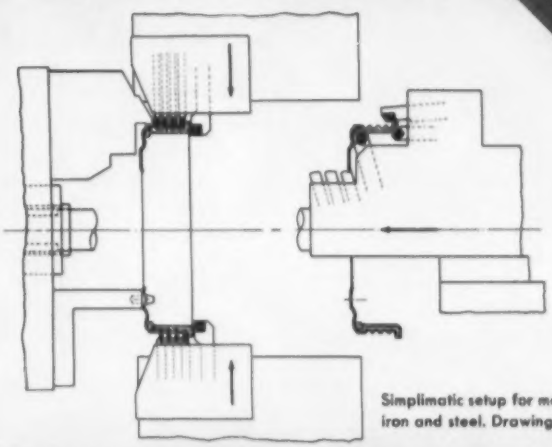
Brake drums handled fast on Simplimatic Automatic Lathe

The workpieces here are brake drums with heavy outer rims of cast iron and stamped back plates of steel. Job requirements are: (1) To do simultaneous machining of two materials, (2) produce a good finish, and (3) complete all work in one chucking.

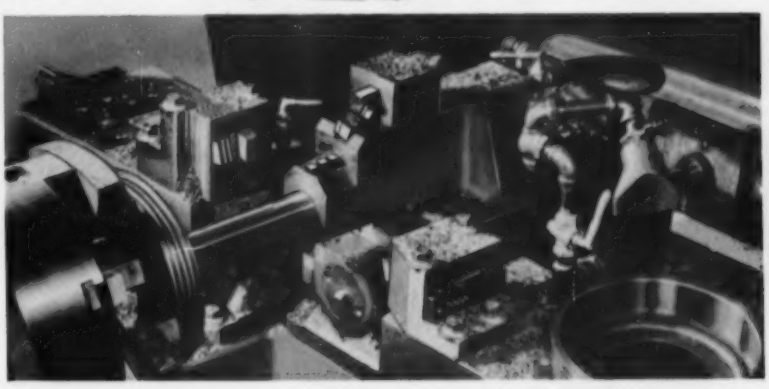
A Simplimatic Automatic Lathe machines the drums, which are 10" in diameter and 2⅜" deep. Chucked on the O.D., wide swivel jaws prevent workpiece distortion. Location is against the back face and drive is through a hole in the steel web.

Carbide-tipped tools on the front and rear slides rough and finish groove and face, while tools on the center slide bore the I.D., chamfer and turn the O.D. of the cast iron rim. At the same time, three high-speed steel tools on the center slide, rough, semi-finish and finish bore the steel back plate. Three tools divide the cut and prevent flaring out of the edges around the bore.

Expert tooling, smart holding and automatic production combine to give a low 1.7 minute f.t.f. time for machining these difficult two-metal parts.

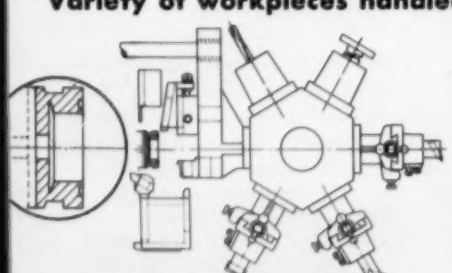


Simplimatic setup for machining drums of cast iron and steel. Drawing shows tooling layout.

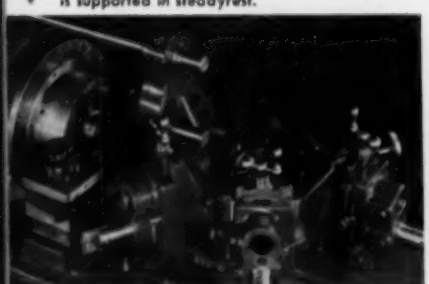


SINGLE CHUCKING GUARANTEES ACCURACY OF SPLIT PARTS

Variety of workpieces handled by one Ram Type Lathe



▼ Special air-operated oversize (5⅜") collet chuck is supported in steadyrest.



These cast iron neck-ring molds are made from stick castings which are split and ground before coming to this machine. To be certain of parallel faces and concentricity, it is important to hold to one chucking.

Here is how it's done on this Gisholt No. 5 Ram Type Turret Lathe: Standard tools on the hexagon turret core drill, co-bore and recess in the cavity, finish turn the O.D., face and groove. Square turret tools rough turn and face, form and groove. Cutoff is from the rear tool post using reverse feed on the cross slide.

Because stick castings are 16" in length, a ball bearing steadyrest supports the work during all machining operations. Time ranges from 5 to 7 minutes f.t.f.

Parallel faces and concentricity of these divided parts are insured by completing all machining in one handling on a Gisholt Ram Type Turret Lathe.

Completed neck ring for bottle mold.

"What You Should Know About Buying and Renting Machine Tools"

This new bulletin reviews the most current and up-to-date thinking on leasing and time payment plans. Ask for your free copy of P-1173. No obligation, of course.

GISHOLT

TIME-SAVING IDEAS

CORRECTIVE MACHINING CUTS DOWN 155 MM SHELL LOSSES

Gisholt 2L Saddle Type Turret Lathe Performs Money-Saving Service

Shell production is big production. Slips are bound to occur along the line sometimes. The job of this 2L Saddle Type Turret Lathe is to make good shells out of bad ones by performing these five corrective machining operations:

Operation 1 Nose end. Face from square turret, bore and co-bore from hexagon turret.

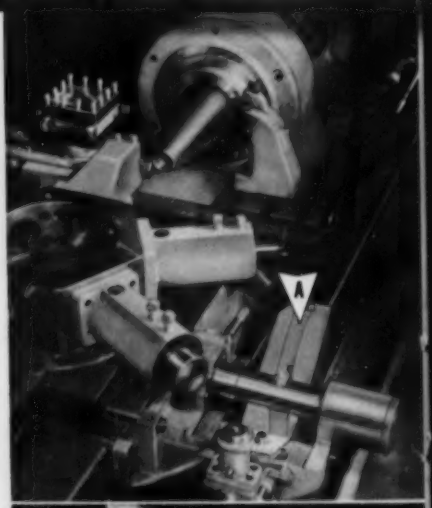
Operation 2 Ogive. Locate from nose end and turn ogive with special tool on hexagon turret governed by special taper attachment cam plate (see A).

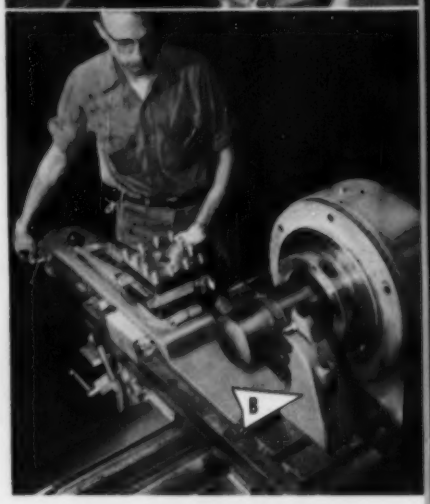
Operation 3 Base end and boattail. Face from square turret and turn boattail with square turret tool governed by special taper attachment cam plate.

Operation 4 Band groove. Machine band groove with special tool in tool holder at rear of bridge-type cross slide (see B).

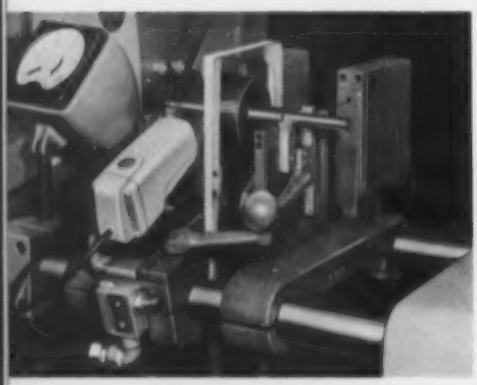
Operation 5 Form band. A special form tool in tool holder at rear of bridge-type cross slide forms band.

This standard saddle type lathe equipped with cross-feeding hexagon turret and bridge-type cross slide meets all shell salvage requirements.





AND NOW, STILL MORE SPEED IN PRODUCTION BALANCING



Lever raises or lowers work-driving belt and starts or stops Balancer for simpler, faster loading.

Loading and Starting of Balancer Made Faster by Double-working Attachment

These armatures are dynamically balanced to low tolerances on a Gisholt 1S DYNETRIC Balancing Machine at a very rapid pace. Yet, a further step-up in speed has been made by the use of a belt lifter attachment.

One easy movement of the hand lever raises the work-driving belt to clear the work or bearings for loading and unloading, and at the same time actuates a micro switch to start or stop the machine drive motor. This simple device pays off very well.

This belt lifter attachment combines with the direct-reading amount meter and other Gisholt Balancer features to attain even higher production speeds for accurately balanced parts.

Balancing School, the only one of its kind, is offered by Gisholt. Covers all phases of this important subject. Write for complete details.

DYNETRIC BALANCERS

No. 1-255

634

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

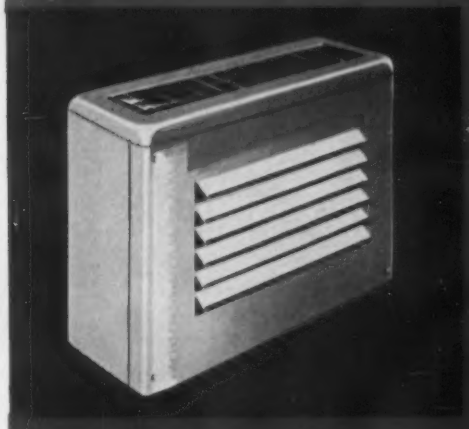
TALK TO GISHOLT ABOUT MACHINE TOOL LEASING

Why deep draws with

Weirzin

electrolytic zinc-coated sheets

provide important manufacturing economies



Because Weirzin has been proved to retain its amazingly uniform protective coating under extreme fabricating operations, it is specified by leading manufacturers for a wide variety of products.

Drawing and forming are performed rapidly, with complete absence of flaking, cracking, or peeling. Inventory losses due to rust are materially reduced. Heat and moisture are successfully resisted. Absence of underfilm corrosion assures not only longer life, but also adherence of paint, lacquer, enamel and lithograph ink. And, for even longer adhesion, chemically treated Weirzin is available.

When the job calls for difficult deep draws, specify Weirzin and enjoy the double advantage of quality and economy.

WEIRTON STEEL COMPANY

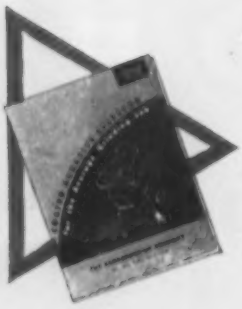
Weirton, West Virginia

NATIONAL STEEL CORPORATION

● Deburring metal grille with cartridge rolls

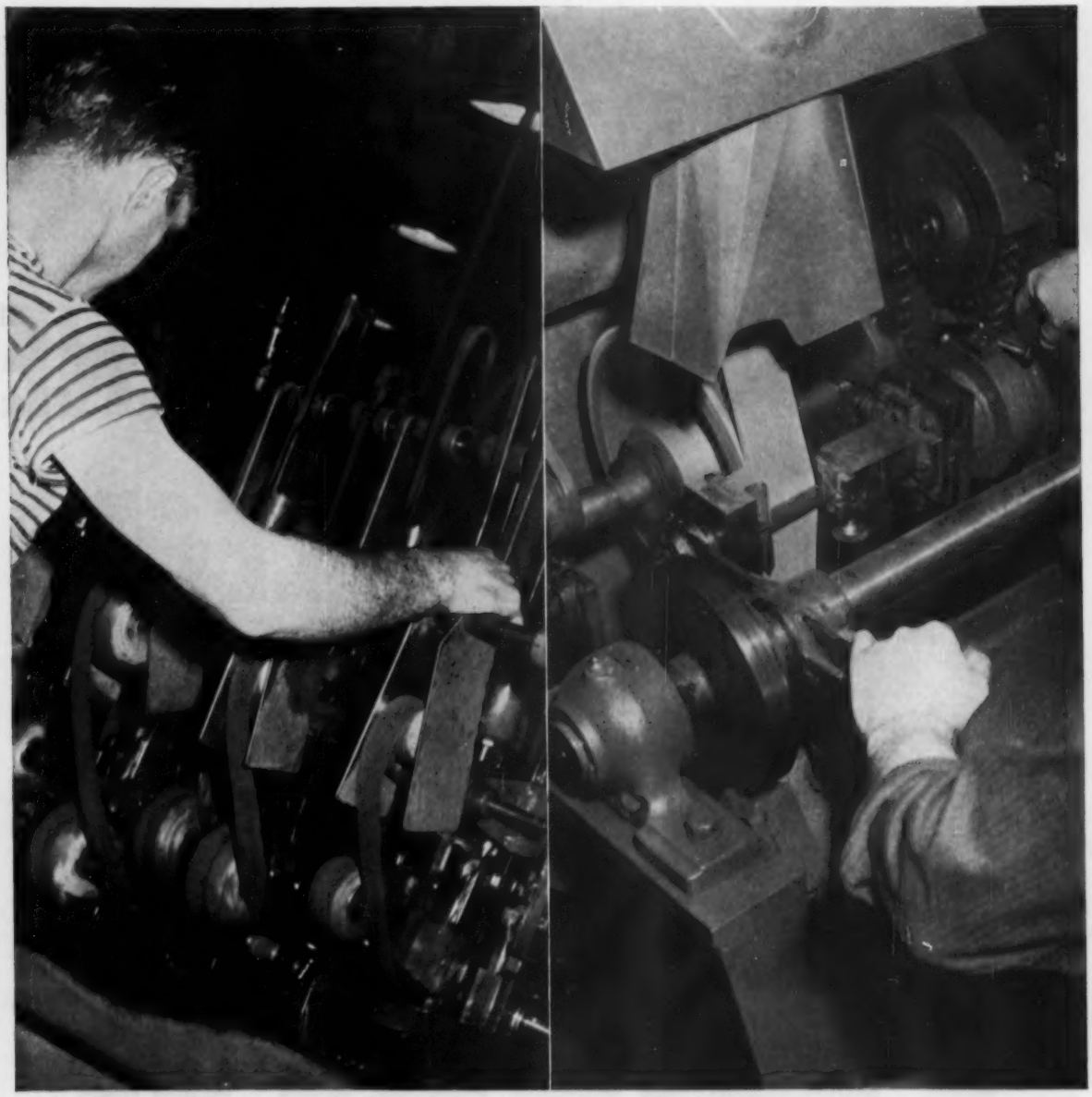
● Smoothing castings with PORT-A-BELT Grinding Attachment

COATED ABRASIVES *designed for*



CALL YOUR CARBORUNDUM DISTRIBUTOR or salesman today... listed in the yellow pages of your phone book under "Abrasives" or "Grinding Wheels." He'll recommend the coated abrasives designed for your particular operations... give you a demonstration in your own shop, on your own equipment.

FREE! COATED ABRASIVE SELECTOR helps you choose the proper abrasives for every application. Write The Carborundum Company, Dept. IA 82-54, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.



● Polishing crankshafts with abrasive tape on automatic machine

● Grinding jet aircraft blades on abrasive belt machine

your **TOUGHEST** *production* **SCHEDULES!**

For grinding, finishing or polishing any kind of metal...with portable equipment or complex automatic machines... the *proper* coated abrasive products and techniques developed by CARBORUNDUM can save hours of production time, cut your costs, and give superior results on every job.

● **TOP QUALITY** abrasive grain—silicon carbide and aluminum oxide—durable cloth and fibre backings, and tough resin bonds with greater holding power, combine to give you belts, tapes, discs, sleeves, cones and rolls that cut faster, last longer and produce better finishes. ● **SPECIAL ATTACHMENTS** developed by CARBORUNDUM save time and money, too! The "61" PORT-A-BELT Grinding Attachment, for example, lets you bring the abrasive belt to the work ... gives fast, low-cost grinding on any surface—flat, convex or concave. *One* operation with PORT-A-BELT replaces two or three with conventional tools.

CARBORUNDUM

REGISTERED TRADE MARK

...continually putting more **SENSE** *in your abrasive* **DOLLAR**

NOW...
WITH ONE MACHINE
YOU CAN SELECT
the ideal arc
AC or DC
for every job with
LINCOLN
IDEALARC®

4 types of arc at your fingertips

★ AC SOFT ARC

★ AC FORCEFUL ARC

★ DC SOFT ARC

★ DC FORCEFUL ARC

TO THE MAN WHO USES AC

For the first time . . . an AC welder with truly stable arc —*plus* choice of soft arc for smooth, clean welds; forceful arc for maximum in penetration and non-sticking operation.

TO THE MAN WHO USES DC

For the first time . . . a heavy duty, dependable DC welder that combines the efficiency of the rectifier with versatility of selecting a soft and forceful arc. *Then you can switch to AC instantly, where the job can be done better with AC.*

TO THE MAN WHO USES BOTH AC AND DC

For the first time . . . in *one* machine, both AC and DC with selection of soft arc or forceful arc in either AC or DC. Gives you the ultimate in speed, ease, low cost.

START CUTTING COSTS . . . NOW!

Send for Bulletin 1343 showing how hand welding can be simplified, done faster, for lower cost. Write.

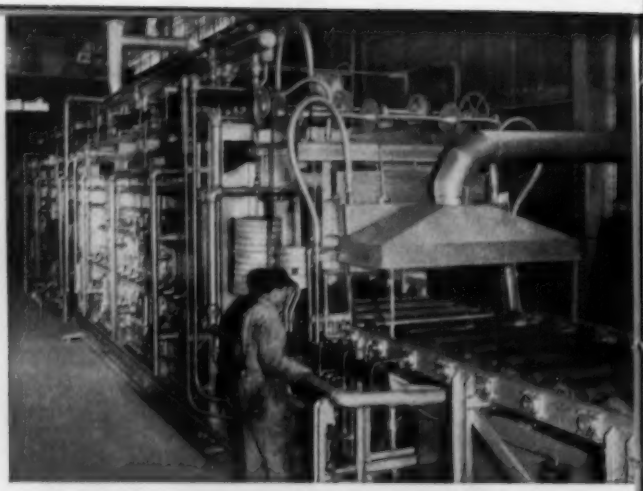
GET THE FACTS
SEND FOR BULLETIN 1343

THE LINCOLN ELECTRIC COMPANY

Dept. 1501 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

continuous processing

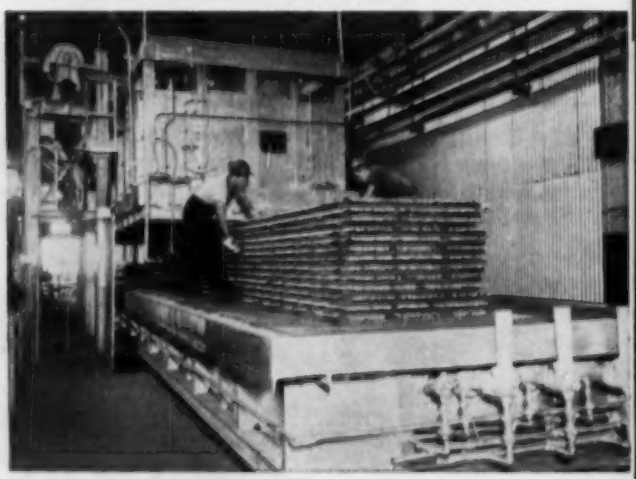


'Surface' roller hearth furnace for continuous carbon restoration-annealing of bars and coils.

'Surface' atmosphere equipment

'Surface' lift cover car bottom furnace used for batch carbon restoration-annealing of bar stock.

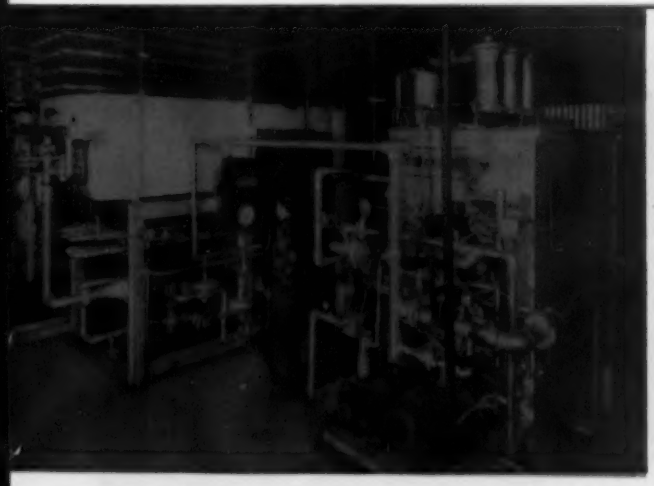
batch processing



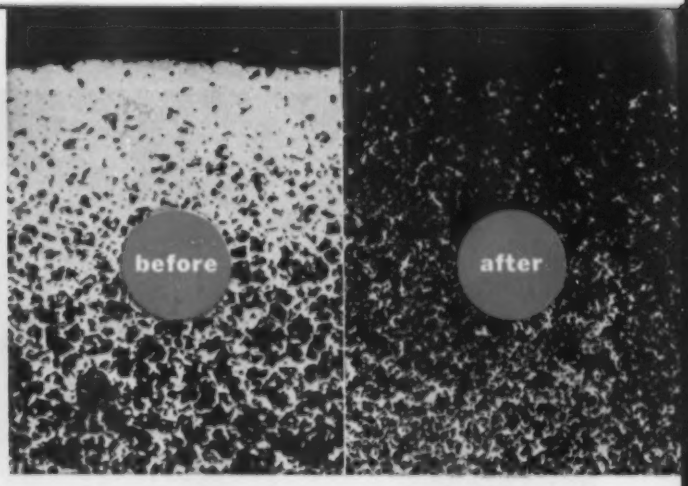
Here are a couple of graphic reminders that Surface Combustion atmosphere equipment helps meet today's demands for top quality steel.

These cases repeat a familiar story in the steel industry: a steel processor wants to improve the metallurgical qualities of his stock—'Surface' equipment meets, and frequently exceeds, his specifications.

In your current program for improving the marketability of your products, look to 'Surface' to provide the right atmosphere for easier sales.



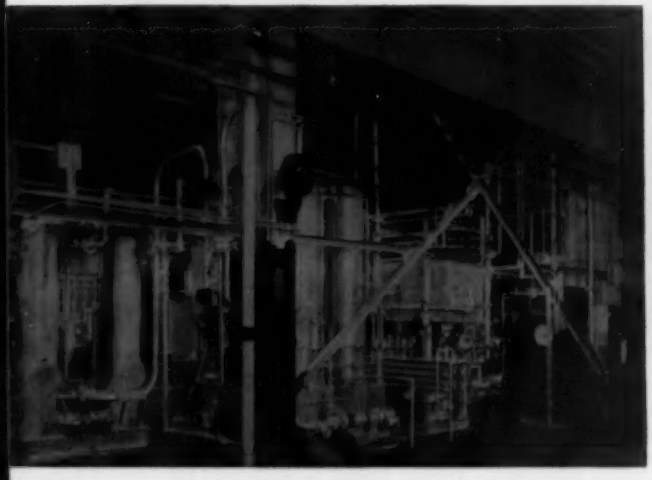
'Surface' atmosphere generators for this installation. RX unit in the foreground, NX unit in the background.



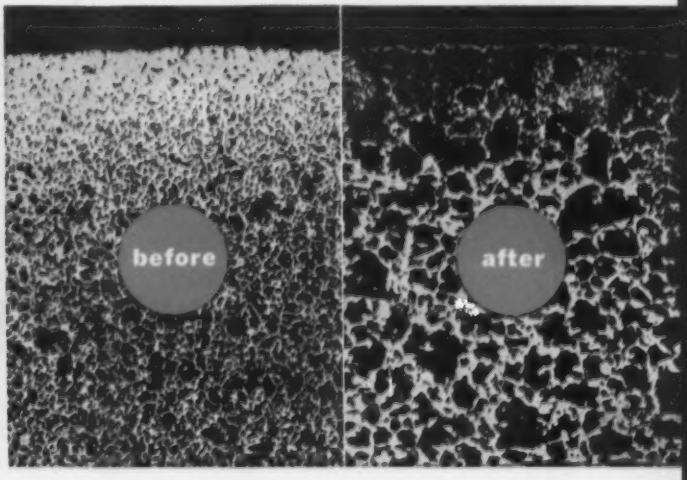
Before and after photomicrographs, Carbon steel AISI C1050. The results: carbon restored to the decarburized skin; steel which reduces the customer's machining costs, eliminates rejects.

makes steel easier to sell

'Surface' atmosphere generators next to the furnace. NX generators and coolers in the foreground, RX generator and dew point recorder in the background.

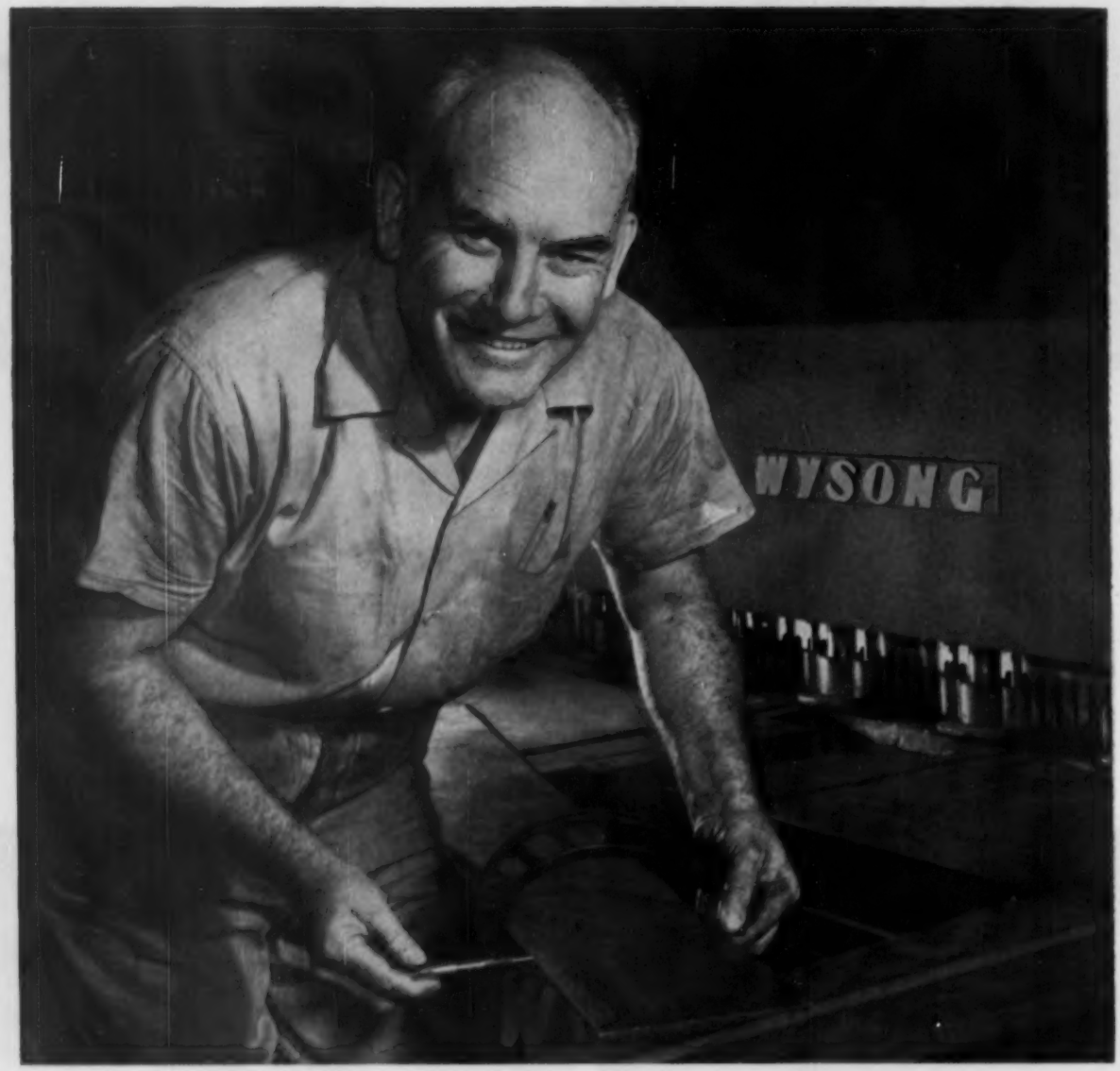


Before and after photomicrographs, C-1045, 1 1/16" round, coarse grain, 75x, 4% Nital etch. The results: carbon restored to the decarburized skin; steel that sells and opens new markets for the processor.



Surface
STEEL MILL FURNACES

SURFACE COMBUSTION CORPORATION · TOLEDO 1, OHIO



SHEAR SATISFACTION!

When you use a Wysong, you will know what I mean—a clean, *accurate* cut and complete confidence that the next cut will be just like it.

Wysong Shears are designed and built for that kind of shearing — rugged enough to withstand the shock of capacity shearing, rigid enough to maintain accurate alignment.

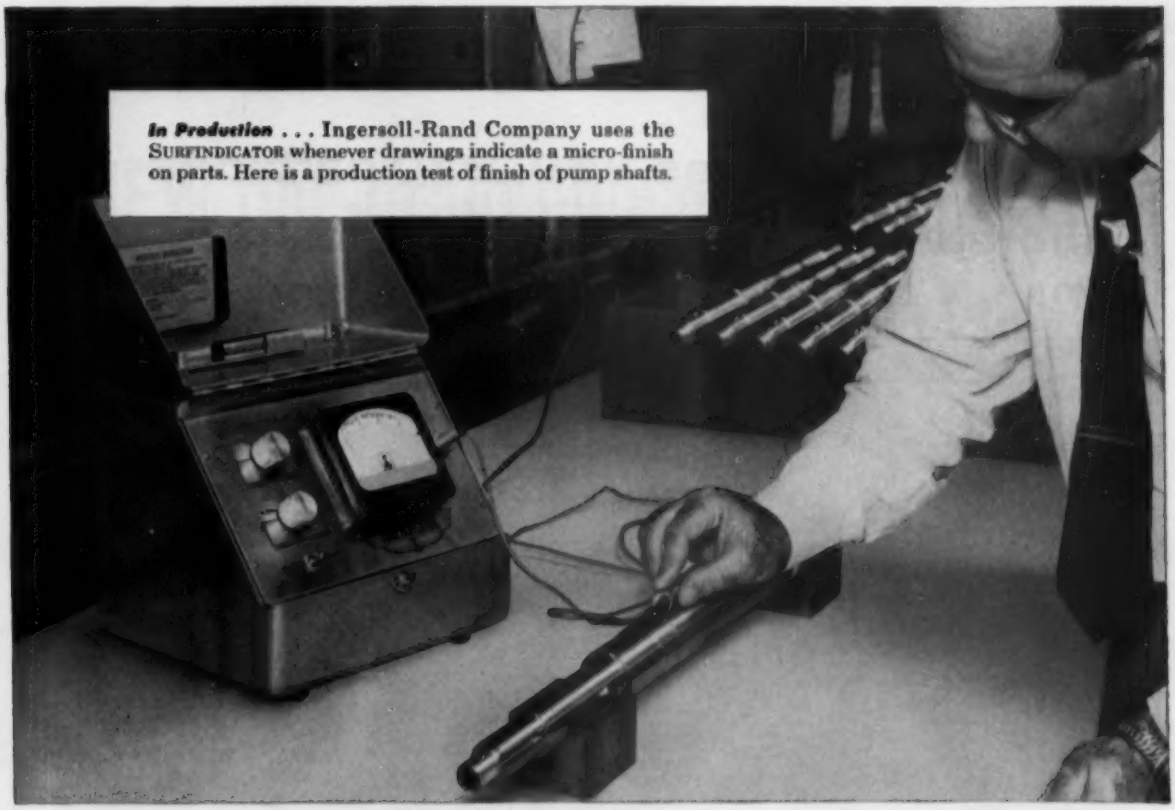
You will want to know about the rigid, hi-tensile castings; the drive unit which runs in oil; the non-repeat unit; the positive, compensating holddown; the ball-bearing precision back gauge; and other superior Wysong features. They add up to SHEAR SATISFACTION—for the boss and the operator, too.

Before you buy, investigate WYSONG . . . it's MILES ahead! See your dealer or write factory for new catalog.

WYSONG

WYSONG AND MILES COMPANY • GREENSBORO, NORTH CAROLINA

Builders of Precision Machines For Over Fifty Years.



In Production . . . Ingersoll-Rand Company uses the SURFINDICATOR whenever drawings indicate a micro-finish on parts. Here is a production test of finish of pump shafts.

SURFINDICATOR* QUICKLY PAYS FOR ITSELF

through better surface finish control

THIS MODESTLY PRICED instrument permits you to measure surface roughness quickly, easily, surely—*in the shop.* With simple checks of surface finish you can:

. . . speed up inspection, avoiding costly delays and arguments.

. . . reduce machining costs by eliminating unnecessary overfinishing.

. . . meet specifications exactly.

The SURFINDICATOR is portable, can be calibrated on the spot, can be operated by anyone. Surface roughness in microinches is indicated directly on the meter. The SURFINDICATOR quickly pays for itself and helps you operate more efficiently. Send coupon today for complete information. *Trade-Mark

In Development . . . Behr-Manning's laboratory evaluates coated abrasives by checking finish on test parts. Company reports, "SURFINDICATOR has been most satisfactory"

BRUSH ELECTRONICS COMPANY

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZOELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT AND COMPONENTS

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Division of Clevite Corporation

Brush Electronics Company, Dept. S-2
3405 Perkins Avenue, Cleveland 14, Ohio.

☐ Please send free copy of "Surface Finish Control".

☐ Have your nearest representative demonstrate the SURFINDICATOR to me.

Name _____

Position _____

Company _____

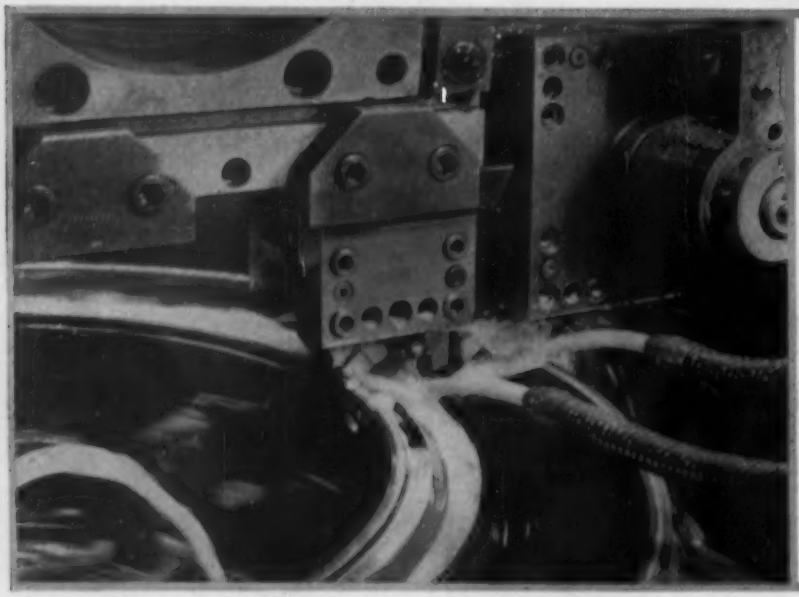
Address _____

City _____ *State* _____

Industry-wide records prove that...

compared with other steel-cutting carbides...

Carboloy® Grades 350, 370 carbides increase production as much as 3⅔ times



BEFORE CARBOLOY GRADE 370, 17 other carbides were tried by the Jet Division, Thompson Products, Inc., for facing 310 stainless-steel jet engine compressor frames. Best any carbide could do was 3 pieces per 8-hour shift. With Grade 370, production jumped to 14 pieces. Downtime losses were cut because Grade 370 inserts machined almost 3 times as many pieces per grind.

SETUP: Material—310 stainless steel. **Speed**—340 SFPM. **Feed**—0.008 inch. **Depth of cut**—0.100 inch at 36 rpm. **Coolant**—Yes.

BECAUSE THEY CUT MORE STEEL PER MINUTE, new Carboloy medium-duty Grade 350 and heavy-duty Grade 370 are drastically reducing metal-working costs in plants throughout the United States.

Reports from users prove that "350" and "370"—

1. Cut more cubic inches of steel per minute than any other carbides—increasing production as much as 3⅔ times
2. Assure longer tool life
3. Decrease downtime
4. Provide wear resistance and extreme toughness never before experienced
5. Operate at temperatures as high as 1800° F. without tip deformation.

Because of these benefits, and their ability to operate at unusual feeds and speeds, Grades 350 and 370 enable you to obtain optimum results from your machine tools.

The performance of these two carbides is a standing challenge to all operating management of metal-working plants. For it shows the way to increased production and lower costs in metal-cutting operations—*now*. Write for case histories of in-plant operations.

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

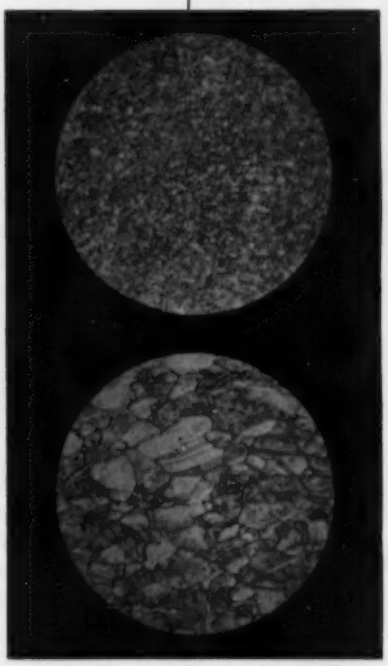
11153 E. 8 Mile Ave., Detroit 32, Michigan

Carboloy Created-Metals for Industrial Progress

DURAFLEX . . .

a NEW fine-grain phosphor bronze with 30% GREATER ENDURANCE LIMIT

FINE-GRAIN STRUCTURE IS THE MAIN REASON . . .



Micrographs (75x magnification) tell the inside story. Top, note the fine-grain structure of DURAFLEX. Compare it with the grain structure of ordinary phosphor bronze, bottom.

DURAFLEX* is a new, fine-grain phosphor bronze developed and sold only by Anaconda. Comparative fatigue tests show that the endurance limit of DURAFLEX is approximately 30% higher than for ordinary phosphor bronzes. In surface appearance, surface smoothness and resistance to corrosion, it is equal to, or better than, other phosphor bronzes. Further, its formability is increased with no sacrifice in yield strength. DURAFLEX is a *premium* phosphor bronze in every way except cost; there's *no increase in price.*

If you're now using a hard-temper phosphor bronze, chances are that you can do the same forming in extra-hard temper DURAFLEX. If you're looking for longer life in the parts you form, we'll be glad to send you a free sample of DURAFLEX. Try it, test it, and you will agree that it's superior.

5576 *Trade-Mark

DURAFLEX fine-grain phosphor bronze

an ANACONDA® product

MADE BY THE AMERICAN BRASS COMPANY

Try a FREE SAMPLE of

DURAFLEX

Sheet . . . up to 0.062" thick
Wire . . . up to 3/16" diameter (approx.)

FREE SAMPLE

The American Brass Company, Waterbury 20, Connecticut
(In Canada: Anaconda American Brass Ltd., New Toronto, Ontario)

Yes, we'd like to try DURAFLEX. Please send us a free sample of
sheet in _____ temper, _____ thick,
wire in _____ temper, _____ diameter.
☐ We'd like to talk to one of your metallurgists about DURAFLEX.

NAME.....
COMPANY.....
STREET.....
CITY.....ZONE....STATE.....

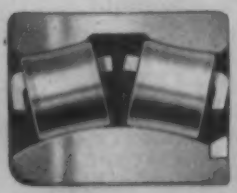
NEW! For severe impact and heavy loads LINK-BELT presents "MILL BEARINGS"

Link-Belt "Mill Bearings" are part of industry's most complete line of ball and roller bearing blocks.

STEEL PILLOW BLOCKS are the answer wherever bearings must withstand great shock and impact loads—as on steel mill, foundry, oil drilling, mining, construction and other heavy-duty equipment. That's why Link-Belt offers this line of Mill Bearings.

Perhaps your bearing demands are less extreme. Whatever your need, you'll find the right answer in this complete line of pillow blocks . . . plus flange, flange-cartridge, cartridge, take-up and hanger blocks and self-aligning roller bearings. Ask your nearest Link-Belt office or authorized stock-carrying distributor for a copy of the helpful 120-page Data Book 2550 on the full line, and 8-page Book 2565-A on Link-Belt "Mill Bearings."

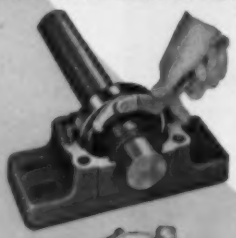
All these important differences are found only in Link-Belt "MILL BEARINGS"



FREE-ROLLING SELF-ALIGNMENT. Adjusts immediately in all directions, assuring full load capacity, even when subjected to shaft deflections and inaccuracies of mounting. Important because "Mill Bearings" are subject to heavy, sudden shock loads.

ONE BASIC HOUSING accommodates either type of seal shown at left. They keep lubricant in and dirt out.

Left, Spiral Labyrinth Steel Seals for heat conditions, oil or grease lubrication. Right, combination felt and synthetic rubber contact type seal for dusty conditions, grease lubrication.



EASY INSTALLATION AND MAINTENANCE. Removal of cap means removal of bolts and hence no interference with assembly and inspection.

SUPER-RUGGED STEEL HOUSING. Four large heat-treated thru-bolts lock with heat-treated alloy steel serrated nuts to firmly clamp cap and base, permitting maximum radial and thrust loads. Big base area supports the bearing and withstands the extremely heavy pounding of mill and other grueling operations.

LINK-BELT

Ball and Roller Bearings

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World 12.710-A

Machines too, develop through EVOLUTION

LEES-BRADNER

Proudly announces the latest developments in the model 7 type* HD *high speed production hobbing machine

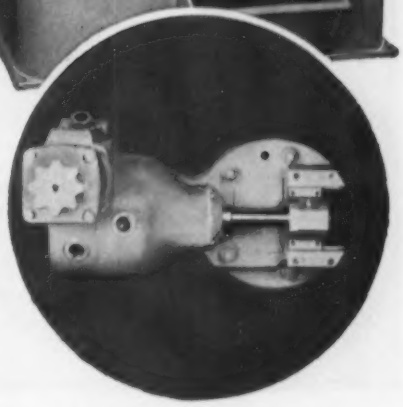
Just as given species improve, giving way to the constant press of nature, so do machines change and improve with the ever-increasing demands of industry.

The Lees-Bradner 7 HD Single Spindle Hobber is a good example. It has moved forward in engineering and design improvements to meet today's and tomorrow's production demands.

Pioneers in high speed hobbing, The Lees-Bradner Company has, through constant experimentation, created a hobbing machine far superior to its prototype. The new Model 7 Type HD Single Spindle Hobbing Machine offers industry a heavier and faster machine. Weighing approximately 1,000 lbs. more than its predecessor, it has a heavier headstock, heavier column, 10 H. P. motor and 2 H. P. rapid traverse motor.

Designed-in improvements such as these give industry savings in time and labor while meeting today's production demands . . . plus the extra capacity for tomorrow's requirements.

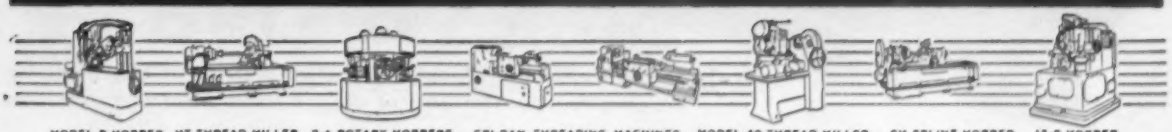
Demonstrations may be arranged on request. Contact your Lees-Bradner representative, or write us direct. No obligation, of course.



The above photographic close-up shows the new, heavier hob head with Timken bearing construction and 3-inch hob shift and new outer support.

the LEES-BRADNER Company

CLEVELAND 11, OHIO, U. S. A.



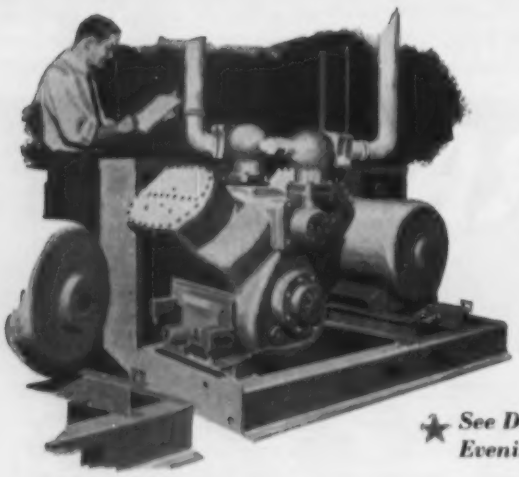
MODEL 8 HOBBER · HT THREAD MILLER · 7-A ROTARY HOBBERS · CRI-DAN THREADING MACHINES · MODEL 40 THREAD MILLER · 5H SPLINE HOBBER · 12-B HOBBER

IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER

For almost every industrial need you will find

Delco

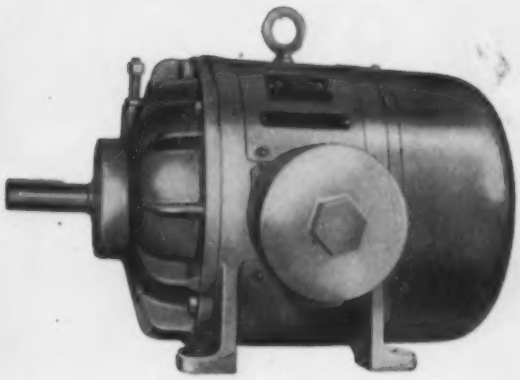
preferred !

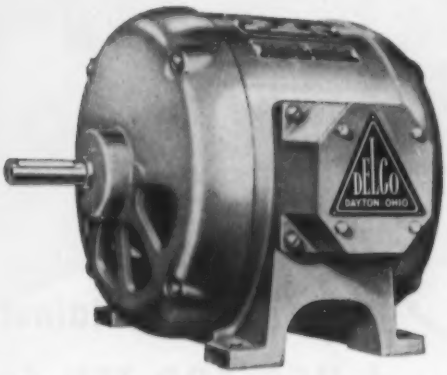


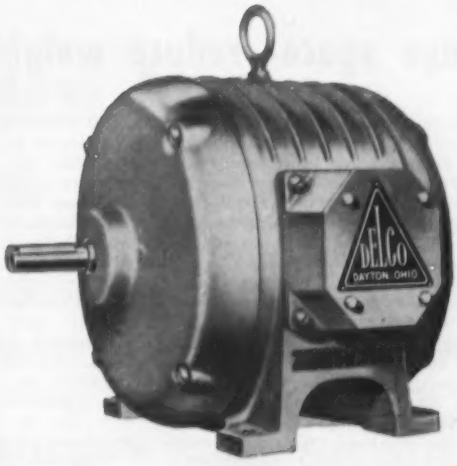
There's a Delco Electric Motor for nearly every industrial need. From the smallest integrals to totally enclosed, fan-cooled giants, Delco Electric Motors give peak performance and consistent dependability on any job.

Even more important, your Delco Electric Motor is job-fitted to your special needs. Then it is *engineered* into your operation. Fact is, our Delco engineers sit down with your engineers and work to find the *right answer* to your motor problem.

★ ***See Delco Electric Motor national advertising in The Saturday Evening Post for the story of the full Delco Electric Motor line.***







Each Delco motor is built to one rigid quality standard, and subjected to exhaustive tests through production. That's why Delco motors have been proved best by performance . . . why Delco motors are preferred by industry.

And wherever Delco motors go to work Delco parts and service facilities aren't far away.

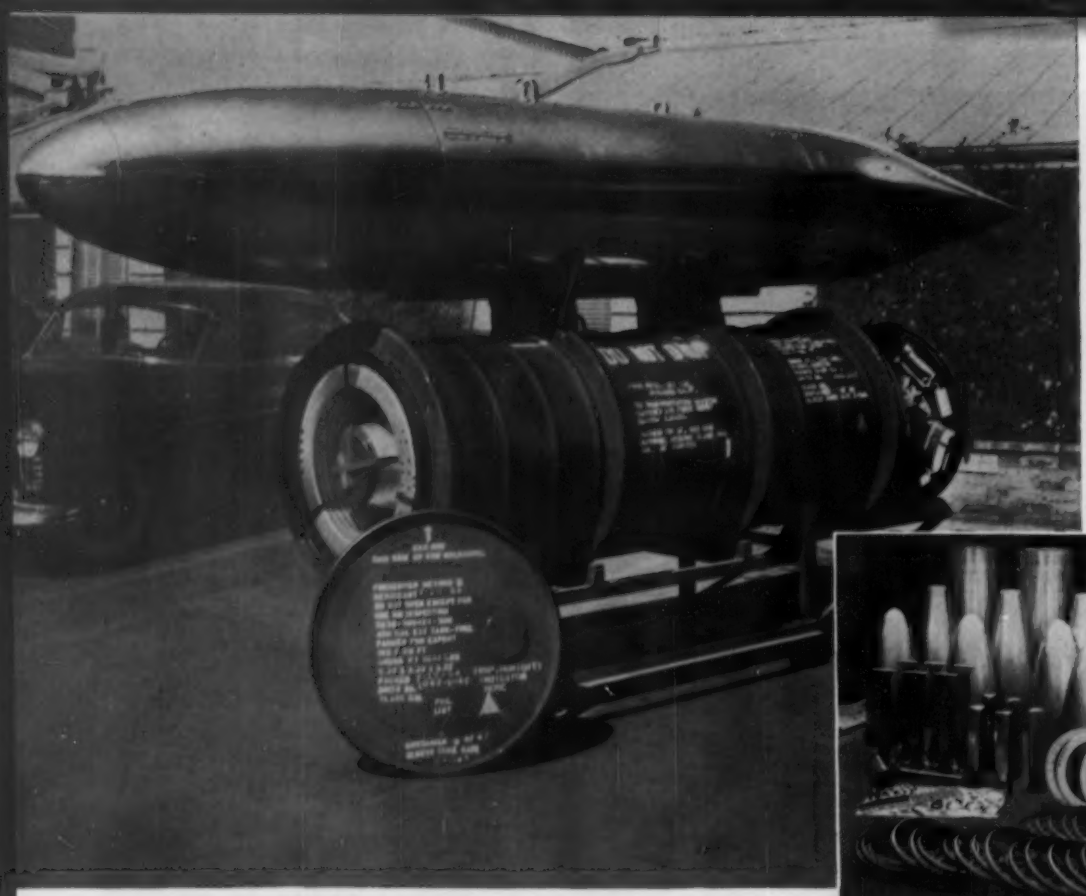
Delco Products, Division of General Motors
Dayton, Ohio.

GM GENERAL MOTORS DELCO

DELCO *Electric* MOTORS

PRODUCT OF GENERAL MOTORS

Proved best by Performance!



This picture shows a COR-TEN Steel container and an assembled wing tank mounted on it for display purposes.

(Below) All these components for six 450-gallon wing tanks are ingeniously nested and carried in a single Royal Jet Tank Can made of USS COR-TEN Steel. Tanks can be easily and quickly assembled in the field.

How containers for jettisonable fuel tanks—made of USS COR-TEN Steel—save 40% in shipping and storage space—reduce weight 25%—cost 10% less than crates

Shipped six-at-a-time in these COR-TEN Steel "cans," 450-gallon wing tanks for jet aircraft now travel more safely and more cheaply to their distant destinations. Not only are they better protected than ever before against shipping and landing hazards but they are indefinitely preserved in storage.

Royal Jet, Inc. of Alhambra, Calif., developer, designer and manufacturer of these efficient containers, has found COR-TEN Steel the most satisfactory material from the standpoint of lightweight, permanence, ease of manufacture and reasonable cost.

For with USS COR-TEN Steel which is 50% stronger than carbon steel and offers 4 to 6 times greater resistance to atmospheric corrosion they can use light 12 ga. and 18 ga. sheets to build containers of great strength and ruggedness that weigh 25% less than wooden crates.

These steel containers offer other advantages, too. Hermetically sealed and filled with dry air they contain sufficient dessicant to insure minimum moisture content. Since no organic materials are used in the padding, fungus growth and interior corrosion are eliminated. As a result the sealed-in tanks stay factory-new regardless of temperature, climate or length of storage. Containers can be stored in the open for an indefinite period with a minimum of damage or deterioration.

This new packaging technique pays off. By replacing wooden crates, formerly used, with these COR-TEN Steel containers, weight per wing tank shipped has been materially reduced, 40% less storage and shipping space is required and the shipping cost to Europe, for example, has been reduced $21.36 per tank—a saving to the Government, on only 100,000 tanks, of more than $2,000,000.

SOON TO BE ISSUED. Our new "Design Manual for High Strength Steels" contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the use of high strength steels. Watch our future advertisements for the announcement of the availability of this important publication.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS COR-TEN HIGH Strength STEEL

USS

9-440

UNITED STATES STEEL

Sales Up . . . Profits Down?

The Answer is New Methods on NEW BRITAIN

- AUTOMATIC CHUCKERS
- MULTIPLE SPINDLE BAR MACHINES
- SINGLE SPINDLE AUTOMATICS
- PRECISION BORING MACHINES
- LUCAS PRECISION HORIZONTALS
- NEW BRITAIN +GF+ COPY LATHES

See the following four pages for other New Britain New's.

The secret of precision boring is constant close control of the tool

Precision-ground cams assure accuracy of tool paths under all conditions on a New Britain Precision Boring Machine. Equally important is split-second control of cycle timing. This is accomplished by means of the program drum illustrated at the right. Cams and trip dogs accurately time all motions of the tool and the machine units. It is enclosed by a lift-off cover and is immediately accessible from the operator's side of the machine. These are important features of the New Britain approach to more profitable precision boring.

New Britain +GF+ Copying Lathe combines 2 operations in 1 pass

Yes, we taper turn the shaft end of this gear blank and copy turn the rest in the same operation — which keeps the cost of the piece down. This happens all the time on a New Britain **+GF+** copying lathe. You can spot other examples of it in the other pieces on the table.

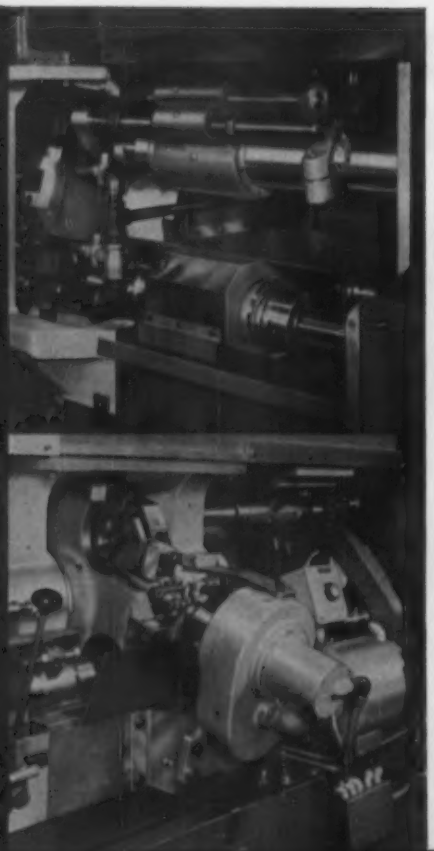
The New Britain **+GF+** is a copy turning machine, not a lathe with an attachment. The copy slide is part of the carriage for taking heavy cuts at carbide speeds. Contoured work in small lots or on an automated basis, is accurately turned from a simple template on the front of the machine.

The secret of carbides on bar machines is elimination of slide deflection

Carbides won't tolerate sloppy feeds. Positive slide actuation on a Model 601 New Britain Automatic results from mounting the cams directly behind the slides. A plus benefit is that cross slide feed changeovers can be made in minutes with these pick-off cams.

See the preceding two pages and the two following for other New Britain *New's*.

Six-spindle production in "Three-spindle" time



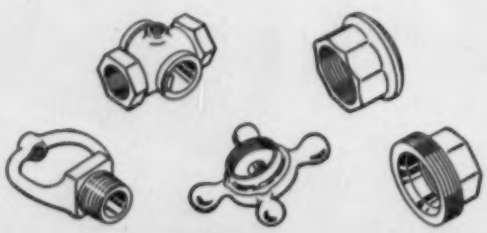
View of the rear side of the machine with the guards removed, showing the two lower spindles and the upper threading spindle.

All controls are within easy reach of the operator. Chucking is accomplished during the operational cycle by manual or semi-automatic means.

This new double-end New Britain Model 365 chucker is specifically for parts which can be machined simultaneously at both ends in one chucking, or two pieces per cycle.

It furnishes the *high spindle speeds* required for work on brass and aluminum, plus *beef* for machining and threading steel, plus *accuracy* guaranteed by a new turret locking mechanism. Idle time is minimized by power chucking and rapid traverse of all slides.

If your requirements include accurate volume production of double-end work, the Model 365 New Britain chucker can be a highly efficient money-maker for you. For more information, please ask for the catalog on Model 365.



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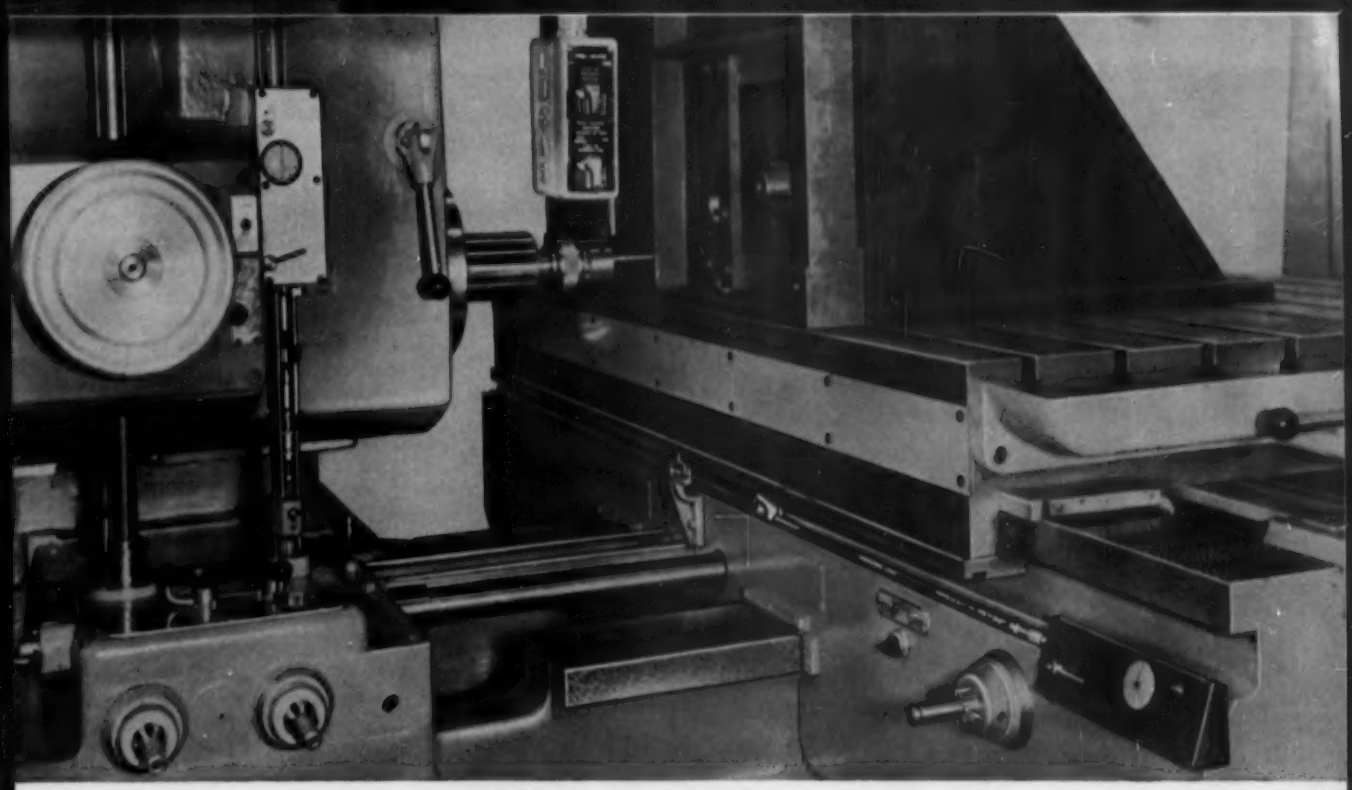
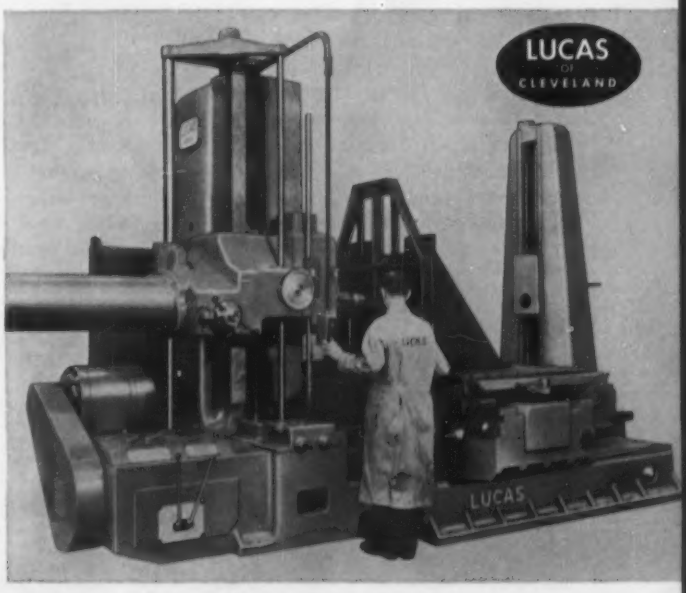


Automatic Power Positioning is a money-maker on boring machine jobs

The entire operation of setting the head and table is done through power feeds at rapid traverse speed. The operator simply inserts the proper measuring rods and starts the positioning cycle. It takes an absolute minimum of time and reduces the chance of error in locating bore centers.

Lucas pioneered and specializes exclusively in building the horizontal boring machine. The full possibilities of this multi-purpose machine are enjoyed by Lucas owners, because of the many important Lucas features and improvements — including Automatic Power Positioning, new simplified pendant control and many more. May we send you the latest descriptive Lucas catalog. Address Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland 8, Ohio.



• AUTOMATIC BAR and CHUCKING MACHINES • PRECISION BORING MACHINES
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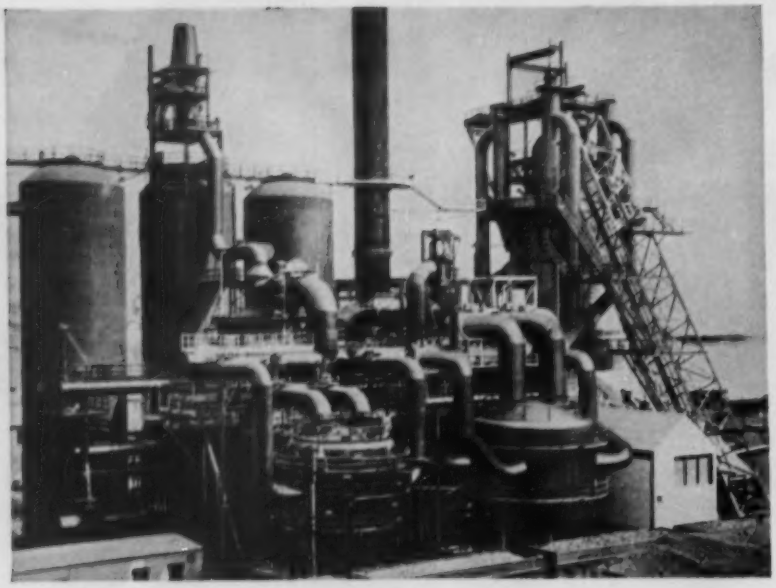
The NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division, New Britain, Connecticut
Lucas Machine Division, Cleveland 8, Ohio

See the preceding four pages for other New Britain *New's*.

(Advertisement)



How Cottrell Precipitators Clean Gas in the Steel Industry

Iron Ore Sintering Plants

The first commercial Cottrell installation for cleaning gases coming from the iron ore sintering machines was placed in operation in 1952 with collection efficiencies exceeding 95%. In this installation the gases leaving the windboxes of the sintering machine pass to a flue, then to a mechanical collector, to the induced draft fans, to the precipitator, and then to stack. The gases enter the precipitator at temperatures of about 250 to 300F, with water vapor content of about 8%. The dust collected is dry and quite fine. The precipitators used on this application are of the horizontal steel plate type.

Iron Blast Furnaces

The cleaning plant in most iron blast furnace installations consists of the preliminary stage (dry dust catchers), the primary stage (water scrubbers) and the secondary stage (water-flushed Cottrell Precipitators). Dust and fume content of the gas is reduced to the range of 0.1 to 0.3 grains per cubic foot of gas corrected to standard conditions before it reaches the Electrical Precipitator. The function of the precipitator is to further clean this gas to a final dust content ranging in most cases from 0.005 to 0.01 grains per cubic foot, depending on how the gas is to be used.

Open Hearths

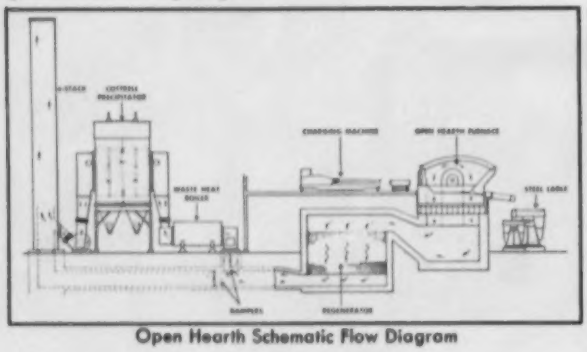
This problem involves the cleaning of combustion gases coming from furnaces, usually oil-fired, and carrying in suspension a heterogeneous mixture of very fine metallic oxides.

After extensive research and pilot plant studies, Research-Cottrell completed the first commercial precipitator installation for cleaning open hearth gases in 1951. Test results at rating indicated efficiencies of over 95% were obtained. Most of the time there was no visible discharge.

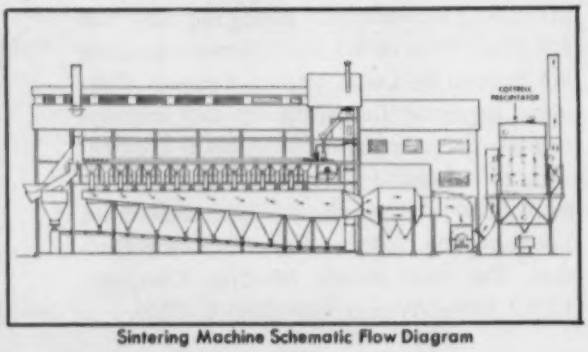
Other Steel Applications

In addition to the above, Research-Cottrell installations are being used for detarring by-product coke oven gas, cleaning oven fuel gas and producer gas, and cleaning ferro-manganese blast furnace gas.

Detailed information on all these applications is available through your nearest Research-Cottrell office.



Open Hearth Schematic Flow Diagram



Sintering Machine Schematic Flow Diagram

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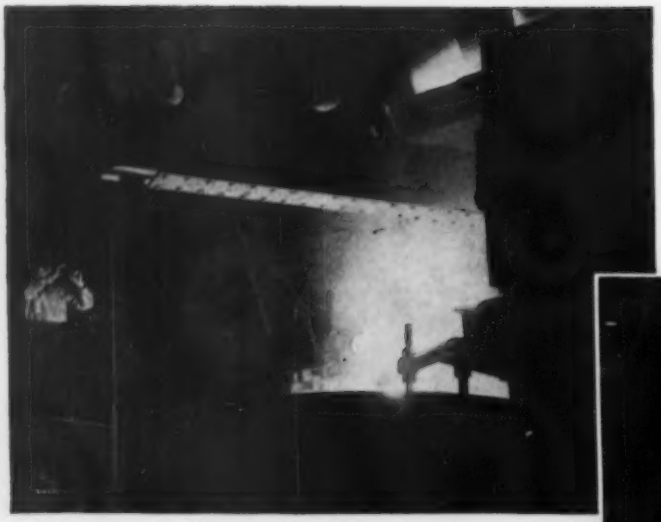

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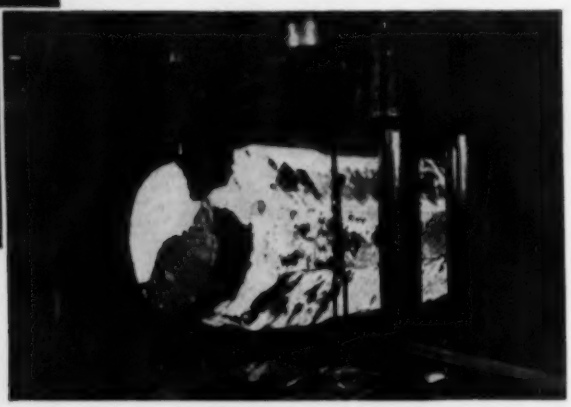
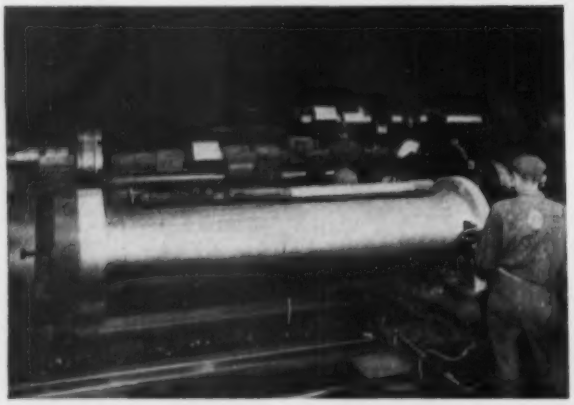
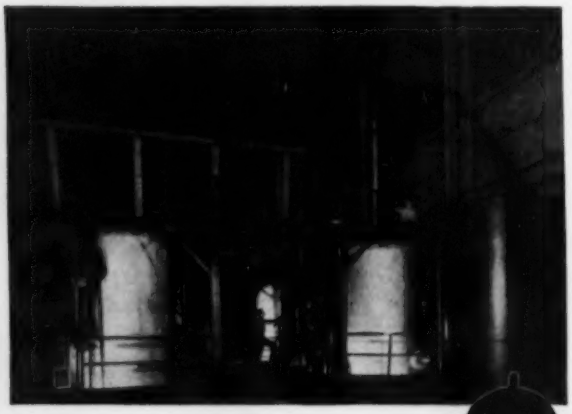
HERE'S THE STORY OF YOUR FORGINGS AT NATIONAL FORGE AND ORDNANCE CO.



2. Forgings are made from Ingots of proper size for the best final result.



3. Forgings are rough-machined before heat treatment to insure greatest uniformity.



4. The heat treating equipment is adapted to the job to be done.

5. National Forge can make your forgings—large or small—rough or finished.

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NATIONAL FORGE AND ORDNANCE CO., IRVINE, WARREN CO., PENNA.

FORECAST

The Iron Age Newsfront

Bigger Titanium Castings

Size of the molten pool of titanium which could be handled in foundry practice has, until recently, been a limiting factor in casting size. Recently 75 lb castings have been cast from a 125 lb heat of metal. A furnace now being built will be able to hold 165 lb of liquid metal and producers look forward to handling heats many times this size.

Crankshafts Balanced After Assembly

A new concept of engine balancing will be used in production of the new Chevrolet V-8. It is based on an electronic brain and drill that automatically cuts into counter-weights at either end of the crankshaft to balance the engine after it is assembled.

How Much Aluminum Will Railroads Use?

Aluminum producers are eyeing the railroads as a future big user of aluminum. Railroads used about 3000 tons of aluminum during 1953. Railroad consumption is expected to skyrocket by 1960 as new light trains come into use.

Dealers Cool to Discount Plan

An employee discount plan recently set up by Chrysler hasn't met with universal approval from dealers. Detroit area dealers, where there is a heavy concentration of Chrysler workers, claim their profits will be substantially decreased.

Machine Tool Outlook for '55

Machine tool sales this year are expected to top last year's totals but fall short of the 1953 level. Shipments will be off somewhat from 1954 figures, and down more from the 1953 rate. Defense spending will help overall machine tool business and replacement of obsolete equipment is expected to continue at a fairly uniform rate.

Industry Applies Printed Circuits

Printed circuits, long heralded as a future major cost saver in radio set assembly, are being thoroughly proved in computer and industrial control designs. In one industrial application, print-board panels can be removed in a few seconds to permit visual inspection for circuit failures.

Will New Laws Hinder Thorium Application?

The magnesium industry is closely following several proposed state labor laws covering work with radioactive materials. Reason: Thorium, a radioactive element, is showing promise as an alloying metal for magnesium. It imparts heat resistance and improves the cold-working properties of magnesium.

Problem: How to Avoid Pipe Mixups

Pipe-type mixups like the one that delayed completion of the atomic submarine Nautilus would be prevented by a proposed new military marking system. Spaced every 3 ft along the pipe would be the manufacturer's symbol, a commercial designation, military purchase specification, and the class and grade of piping.

Upgrading Gray Irons

Gray irons are reported to have shown significant improvements in transverse and tensile strengths, and resistance to growth in cyclic heating through the use of chemical inoculants. Success of the research program, now being tested in production foundries, would aid the foundry industry in upgrading commercial gray iron.

Canada's Steel Boom Going Strong

Canada's boom in steel expansion continues running under a full head of steam. Sites are being considered for a rolling mill in Alberta, with hope that construction can start in the spring. A big tube plant is nearing completion near Vancouver.

More Accurate Temperature Measurement

Improved furnaces as well as faster jet engines may result from studies made with a "saucer" of flame in a vacuum chamber. Pressure in the chamber can be varied from that found at sea level to 65,000 ft altitude. Flat disc of fire makes possible more exact measurement of temperature at all points of the flame.

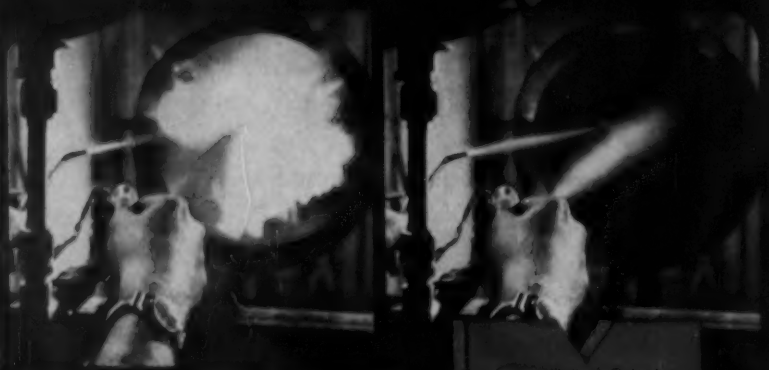
HYDRAULIC DANGER ZONE

Ordinary hydraulic fluid, escaping under pressure, can start a fire 40 ft. or more from a broken line! Is your plant safe? Here's how one firm protects men and machines inside the danger zone . . .

THE SPANG-CHALFANT PLANT of THE NATIONAL SUPPLY CO. switched to fire-resistant Pydraul F-9 hydraulic fluid after a line break involving flammable fluid caused a furnace shutdown, damaged electrical connections and lost 6 hours' production time. The plant operates this Hagan Rotary furnace continuously while a hydraulic boom containing 800 gallons of Pydraul moves white-hot billets in and out of 2250°F. heat. Recently, Pydraul's safety was proved when a ruptured hose sprayed fluid over hot billets and furnace. Result: No damage, no injuries and no time lost! *Pydraul: Reg. U. S. Pat. Off.*

PROOF OF PYDRAUL SAFETY

In photo at left, ordinary hydraulic fluid sprayed into oxyacetylene torch burns explosively. At right, Pydraul does not!



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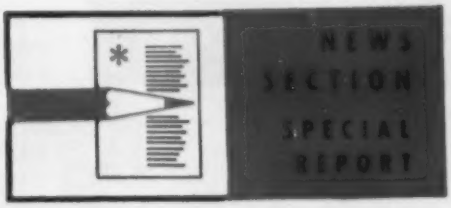


MACHINE TOOLS: Solid But No Boom in '55

Tool builders expect $600 to $700 million in new orders this year . . . Shipments will dip, reflecting '54 order decline . . . Salesmen will go after smaller plants with obsolescent tools—By *E. J. Egan, Jr.*

◆ MACHINE TOOL builders are expecting good business this year. But it won't be a boom. Outlook consensus of a cross-section of industry officials interviewed by THE IRON AGE is this: Total new orders this year should be higher than they were in 1954, but not up to 1953 levels. Shipments will be moderately lower than last year's total and considerably under the 1953 rate.

Best guess for a 1955 new order total would put it somewhere between $600 and $700 million. Last year new orders added up to $560.5 million; in 1953 they totaled $861.8 million.

Shipments this year will inevitably reflect 1954's sales decline, will probably hit between $700 and $800 million. By contrast, 1954 shipments were valued at $891.8 million. In 1953, the cleanup on orders placed during the Korean emergency boosted total deliveries to almost $1.2 billion.

For a so-called peacetime year, the average machine tool builder probably won't be too unhappy when the books close next Dec. 31. In recent times, only 1953 was a better machine tool year than this one is expected to be. But all builders have seen worse. The 1946 through 1949 era was something they hope will never be repeated.

Won't Boom in '55

Industry leaders won't quite go along with predictions that 1955 will be a boom year for machine tools. Most of these are based on (1) the surprising new order upturn last December plus scattered reports of still better January and February business; (2) reports of big new plans for defense spending; (3) tougher competition and rising labor costs forcing replacement of obsolete equipment in civilian metalworking plants.

Builders won't deny that there are helpful influences at work in all three prediction areas. But they point out that the facts as they see them don't add up to boom levels.

The December jump in new orders did make it the best new business month the industry had seen since October 1953. Estimated volume was $60 million, up sharply from November's sales of only $35.4 million. And it's strongly rumored that sales for the first 2 months of this year are holding up very well.

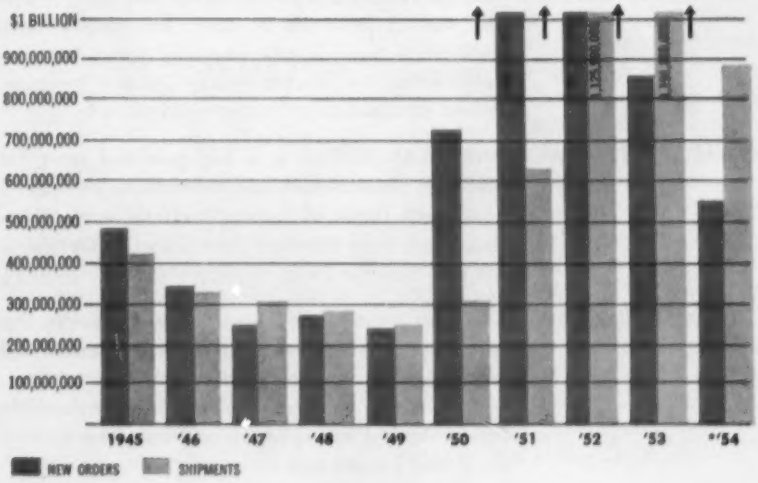
Builders don't underrate the hopeful signs in a rising new order index. But they won't be tempted into evaluating it too optimistically, either. They're used to sharp month-to-month and quarter-to-quarter fluctuations, say these have little effect on the long range picture. The most they'll concede is that new orders should be better this year than last.

Vance Plan A Booster

But even this improvement is going to be spotty. Not all builders will share the better business to the same degree. It's a fairly safe bet that the bulk of buying interest will be focused on automated and other special metalworking equipment. Firms building standard or general purpose tools will have to sell hard to get their share.

In the defense area, builders have known for some time that military machine tool procurement would be good this year. They're counting on at least $100 million from this source. That much money is already available to start

Machine Tool Shipments, New Orders



the "Vance Plan" buildup of reserve tools and facilities.

This program has most machine tool firms on the anxious seat. Air Force has almost $85 million of this Vance Plan money, will find it a big job to commit it all in firm orders this year. And here again the business will be spotty. The Air Force doesn't want much in the way of standard tools. It's looking for long-leadtime equipment which only a comparative handful of builders are qualified to produce.

There's some hope that additional funds for defense spending might come through this year. Builders don't profess to have any inside information on this. But it's no secret that Office of Defense Mobilization is concerned about a shortage of elephant machine tools. A current survey reveals this fact, and it looms beyond the Vance Plan spending now under way. ODM officials guess that maybe $40 million worth of big planers, boring mills and other equipment might be needed for a really flexible mobilization base.

Fight Obsolescence

One thing could upset the machine tool industry's wait-and-see attitude about Washington procurement plans. That would be another shooting war involving the U. S. directly or indirectly. The resulting rush to build metalworking machinery would certainly resemble the World War II and Korean emergencies all over again.

Any attempt to gage the 1955 machine tool outlook puts heavy emphasis on competition and the wage rate situation in civilian metalworking plants. How important are these factors? Many forecasters feel that both elements will put heavy pressure this year on the need to modernize with cost-cutting equipment.

Machine tool builders, perhaps more than any other industry group, are well aware of the huge quantity of obsolete equipment in U. S. plants. They're publicizing this fact, with help from many other sources. But they can't see a mad rush to buy modern tools this year, regardless of competitive situations and climbing wage rates. Builders shoulder some of the blame for this, frankly admit they must do a better selling job.

A few mass production giants, notably the automotive, appliance and electrical firms, frequently meet machine tool builders more than half way on equipment replacement. These customers are always keenly alert to any cost-cutting possibilities. With them the "want" is always present, even though they might not be absolutely certain of what they "need."

Competition Tougher

To settle the "need" problem, teams of production experts consult with builders. The builder with the best idea and lowest price usually gets an order.

This is good business, but it doesn't benefit all the machine tool firms. And competition for these bid bonanzas is getting tougher as more builders set up special machinery divisions.

As the odds against these so-called "handouts" become higher, builders are facing up to a clear fact: The small to medium size metalworking plant is their big potential market for 1955 and many years to come. Here is where builders see the old equipment. But they must sell to shop owners who are often too busy to know much about automation, lease plans, fast depreciation and replacement formulas.

Here is the potential market where a machine tool is considered valuable as long as it still runs. The salesman meets this reluctance, listens to "reasons why not" until he's worn to a frazzle. Being human he retreats to a more "enlightened" plant. He gets a friendly welcome, but he can't sell too many more tools there.

Machine tool sales managers

Who Will Buy Machine Tools This Year?

THE ARMED FORCES—Army, Navy and Air Force have $100 million in Vance Plan funds, will try to commit most of it this year. Air Force will buy about $85 million worth of special cutting tools and press equipment. ODM may enter the buying picture later in the year to build up a reserve of elephant tools.

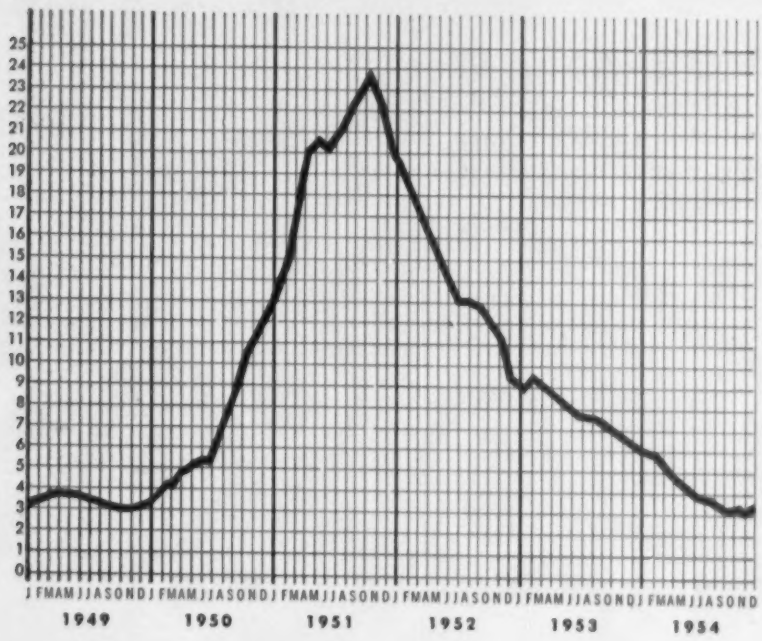
AUTO AND OTHER MASS PRODUCTION FIRMS—Not too many major new tooling programs in sight. But tougher competition, a possible new round of wage increases could boost the present steady demand for automated equipment.

SMALLER METALWORKING PLANTS—This is a big potential area for replacing obsolete tools and methods. Builders aren't happy with results of their sales efforts in this direction, hope their Machine Tool Show in September will help turn the trick.

FOREIGN CUSTOMERS—Builders export sales have slipped steadily for several years. Not much chance the situation will improve this year although more builders are considering setting up overseas plants. One consolation: Foreign tools aren't selling as well over here as they did 2 and 3 years ago.

How Machine Tool Backlogs Have Slipped

(Backlog in Months)



literally squirm as they admit these facts. They are in a tough spot. They're selling spectacularly better equipment than they see in daily use. They can offer tax and credit helps to their prospects that were unheard of a couple of years ago. They'll make a fairly good year of it, but they'd like to do even better.

The giant Machine Tool Show scheduled in Chicago next September should help late 1955 and early 1956 sales. Records show that previous shows haven't caused boom buying activity, but most builders figure to turn at least a few lukewarm prospects into customers after the exhibits close down.

Outlook for machine tool export sales isn't quite as hopeful as the domestic picture. Builders haven't been able to maintain this business at pre-Korean levels. Reasons include (1) a strongly revived European machine tool industry, (2) overseas dollar shortages, (3) high European import tariffs and other "Buy European" restrictions.

Some builders are trying to bypass these export handicaps by setting up overseas branch plants or licensees. This trend is apparently growing but so far it hasn't produced a significant upturn in foreign sales. Nor does there seem to be any sign that these maneuvers will touch off a boom in overall 1955 sales totals.

Aside from sales considerations, biggest danger in this trend toward more extensive overseas building by U. S. firms is the possible effect on the nation's defense production potential. Any major shift in this direction could stretch the U. S. machine tool lifeline dangerously thin. Fear is that hostilities in Europe would cut off shipments from plants on that continent, put an impossible load on shrinking American facilities.

Inventories:

Purchasing agents boost material buying.

More talk of holes developing in raw material inventories was cropping up last week. With steel, copper, and aluminum slowing on delivery, visitors at the annual Purchasing Agents of Chicago show put small stock in reports that consumers are piling up inventories of raw material.

Majority were watching a still advancing production rate in their own plants and wondering how good their own inventories would look by late March. Carbon steel and stainless sheet and strip deliveries are still advancing, copper has been moving out since January at an accelerating pace, and aluminum demand is strong.

February Best Month

For most purchasing agents, their companys' production rate began to advance in September, slowed mildly in December, then came back stronger in January, and February is the best month in the last 8 at least. Warehouses, particularly those carrying a general line of steel had to go back as far as first half 1953 to find a better month. Specialty houses, which shared a generally better 1954 than the warehouse industry as a whole, were equally strong.

As the sales manager of one chain distributing copper, steel, and aluminum specialties put it, "We're not an old firm. About 15 years. But a week ago Tuesday we had the best volume day in the history of the company, and unless I miss my guess, this will be the best February we ever had."

"Normal Limits"

With prices advancing in every product line from wire to plate—few buyers will admit to tucking spare tons in the back shop for future use. Inventories are advancing, they'll admit, but only to "historically normal" limits.

Steel Payroll Jumps

Average hourly payroll cost of wage earners in the iron and steel industry rose to a record $2.333 in 1954, according to American Iron and Steel Institute figures. Annual average for 1953 was $2.267.

Average hourly employment cost, including estimated cost of pensions, social security and insurance, also was higher in 1954 than ever before, at $2.51. The preceding year it averaged $2.44.

The industry's estimated total payroll was $2,908,339,000 during 1954, second highest in history. It was down 13.4 pct from $3,356,504,000 in the preceding year.

LABOR

USW: Will It Ask 32-Hour Week?

Steelmen hope not—but many fear the union will seek a 20-pct cut in weekly hours . . . Not expected this year . . . Would also seek no cut in take-home pay . . . Overtime a question—*By J. B. Delaney.*

◆ IS A 32-HOUR week coming in steel?

Steel executives hope not. But some are afraid so.

It's questionable whether the United Steelworkers can or will raise the issue this year. Existing contracts are reopenable this spring on wages only.

But USW officials are talking about it more and more. I. W. Abel, union secretary-treasurer, mentioned it at a press conference recently in Hamilton, Ont.

Mechanization in steel has not been lost on union officials. On recent "good will" tours through the plants of various companies, they have been amazed at the automatic features of modern processing units.

These same union officials would be the first to admit that mechanization is the steel industry's only defense against constantly increasing costs of labor and raw materials. Their success in negotiating wage increases and fringe benefits for their members emphasizes the industry's need for automation.

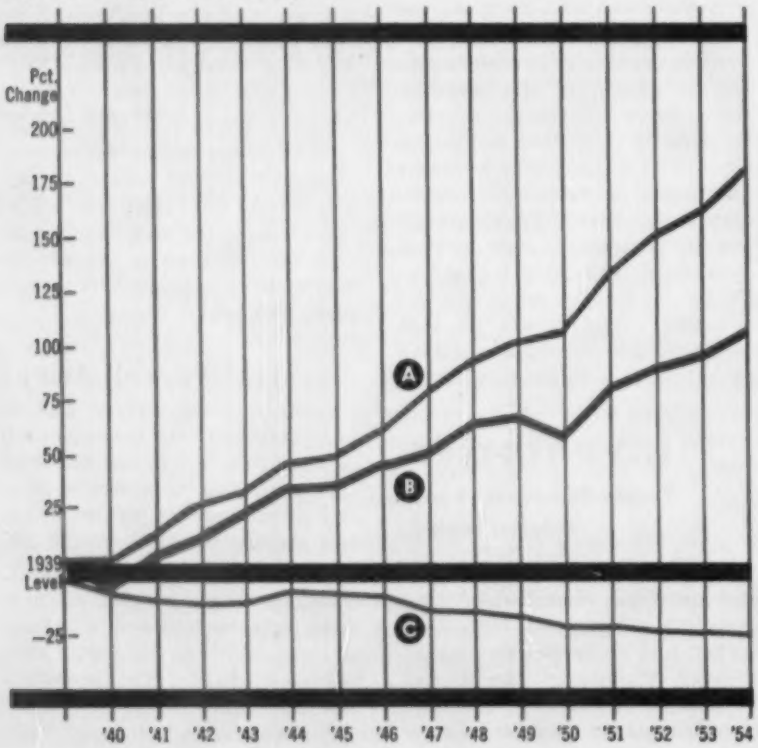
In his Canadian remarks, Mr. Abel said the best way to maintain employment in the steel industry would be through reduction of the work week. He linked the shorter work week with the guaranteed wage.

"How this is to be done will have to be worked out," he said. "But at the present time, steelworkers in the United States have a top work week of 40 hours.

"If methods of production improve, the only solution would appear to be a reduction of the week to a little more than 30 hours, say a 5-day week, with 6½ hours in each shift.

"That would maintain employment, and it is a plan I hope to see linked with our demands for the guaranteed annual wage."

Steel Labor Costs



A—Average hourly earnings (excluding fringes).
B—Wage cost per ton of steel produced (excluding fringes).
C—Man hours worked per ton of steel produced.

USW Sure to Ask

A 32-hour week would mean a 20 pct increase in base labor costs. Cost of supervision also would rise. With more men on the payroll, the industry would pay more for fringe benefits and pensions. These higher costs would have to be compensated for by price increases.

The USW is almost certain to raise the demand in future negotiations.

The industry would resist such a drastic increase in labor costs. If the 32-hour week ever becomes a reality in steel, chances are it would have to be part of a nationwide trend in labor relations encompassing all industry.

Other unions, particularly the United Automobile Workers, have been talking of the short work week as an ultimate labor objective.

The USW can point to a gradual decline in the number of man-hours worked per ton of steel produced. In 1935, for instance, man-

USW's I. W. Abel cites shorter week for steelmen as best way to maintain employment.

hours worked per ton of ingot production was approximately 17.8; in 1954 it had dropped to approximately 10.2. On the other hand, average payroll cost per hour rose from 84.6¢ per hour in 1939 (earliest consistent figure available) to $2.333 per hour in 1954.

On the basis of present average hourly payroll cost, a switch from a 40-hour work week to a 32-hour work week would mean a base hourly wage boost of 46¢ per hour, assuming the union would insist that workers' take-home pay remain the same.

Chances are that if the 32-hour week ever materializes it will come about gradually. Perhaps the initial reduction would be from 40 hours to 36 hours.

Another matter for negotiation would be the starting point of overtime pay. Federal law requires overtime payments for hours worked above 40. Employers probably would insist that this practice prevail even though a shorter work week were to be established in labor contracts.

Steel:

Buyers say demand will stay strong but won't jump.

Steel supply in the second quarter will be a little tighter, says the Steel Committee of the National Assn. of Purchasing Agents. Only real trouble is seen in cold-rolled sheets, galvanized and coated sheets, and cold-rolled strip.

NAPA looks for a slow-down in auto production with a strike stoppage highly possible, but expects no serious labor problems in steel. Steel producers will make some wage concessions and the resulting price boost is estimated at $3 to $5.

Buy More Pipe

Steel consumers in the Midwest anticipate a price hike and will probably try to beat it with heavy protective buying in second quarter. Cold-rolled and galvanized sheets should be particularly active.

In the Chicago area, plates, bars (cold-finished and hot-rolled, both alloy and carbon), and structural steel are readily available. Warehouse stocks are adequate, will get tighter in the next 3-4 months on mill items where demand is now outrunning supply.

Jobs:

Nonferrous leads big jump in Cleveland employment.

Industrial plants in Cleveland scored their biggest month's increase in over a year in January with 3000 new workers. Prospects for additional increase through the year are also good.

Of 100 largest companies in the area reporting to the Chamber of Commerce, 21 expect further increases in employment, 53 expect no change from current levels and only three indicated a downtrend, J. W. Vanden Bosch, business analyst, said. Total payroll is 200,000 in the 100 plants, representing 52 pct of all area industrial production workers, compared to 197,000 in December.

Iron and Steel Second

Biggest surge precentagewise came from nonferrous metal products with 6.8 pct increase. Total employment in the largest category, automotive, went up 3.6 pct to 32,143. Iron and steel and their products continued in second place at 30,585.

Ben Fairless on Automation:

Benjamin F. Fairless, chairman of U. S. Steel Corp., says "propaganda" to assertions that automation causes mass unemployment and calls such arguments a "miserable fraud."

Mr. Fairless is concerned over recent statements of labor leaders and others that machines are pushing people into the background. Regarding the thinking of some labor leaders on the subject, Mr. Fairless scored these groups in the following manner:

"They demand that the government set up a vast welfare program to relieve the suffering that they think automation will bring. They also declare that automation must be offset by a guaranteed annual wage, which would presumably impose heavy penalties on the installation of labor-saving devices and thus retard all technological progress in America."

In a reference to labor thinking more sympathetic to the advantages of automation, Mr. Fairless recalled a statement by the late Philip Murray, first president of the United Steelworkers and the Congress of Industrial Organizations. In a speech before a CIO convention, Mr. Murray said:

"I do not know of a single, solitary instance where a great technological gain has taken place in the United States of America that it has actually thrown people out of work. I do not know of it—I am not aware of it—because the industrial revolution that has taken place in the United States in the past 25 years has brought into the employment field an additional 20 million people."

MANAGEMENT

AMA: Takes Look at Labor Relations

Chicago meeting highlighted by labor relations . . . Management must become more active . . . AFL-CIO merger more than doubles earlier labor power . . . Expect more strikes, longer ones—By *K. W. Bennett.*

TELEVISED collective bargaining session between Rogers Corp. and International Brotherhood of Paper Makers, Locals 43 and 554, was sent over closed circuit to audience of union members in same hotel where it took place. Photo at right shows Rogers' official S. M. Silverstein on screen.

◆ IS MANAGEMENT dozing at the switch in its relations with organized labor?

"In the face of employer apathy, and in the absence of critical international developments, the next 2-year period can be assessed only as the time selected by labor unions to regroup their force before moving ahead once again in the campaign for political and economic control of the nation." The speaker was Washington attorney R. S. Smethurst, discussing the current lull in labor criticism of the Taft-Hartley act, at the American Management Assn. meeting at Chicago last week.

Double Union Power

In a shotgun scattering of topics ranging from a televised collective bargaining talk between the Rogers Corp. and representatives of the International Brotherhood of Paper Makers, to aptitude tests for executives, one theme kept cropping up. Management must become more active in its labor relations, and soon. Here is the pattern:

AFL-CIO merger means something with better than twice the potency of either of the old organizations, facing the same management team that two labor groups have faced in the past. Management can also expect strikes in growing number and duration, with the annual wage a major item.

Part of the answer, management men feel, is a careful adherence by employers to the rules. No going over union officials' heads to the employees or the public. No hiding behind "management prerogatives." Take the problem to the bargaining table and flatten it out finally there.

Taft-Hartley, though currently no longer denounced as a "slave labor law," is still the same law. Though criticism of the legislation is in a current calm, there are some evidences of restiveness in several strong national unions.

The labor contract may be a mutual agreement but too many employers are including clauses in new labor contracts providing for mutual agreement before actual production schedule changes, even in starting up equipment that had previously been shut down. The latter case was unusually bad, but waiting for a mutual agreement with his local on reactivating idle plant equipment resulted in a delay that cost the manufacurer a defense contract. Another new plant was idled 4 months after it was physically ready to begin production.

At least one group attending the conference reported it had been difficult to sell their own management on a policy of working closely with labor.

WATER: How Steel Fills Its Needs

Armco gets 8 million gal per day from well—but needs 11 million . . . Building recirculation system . . . Will recover iron formerly wasted . . . How pollution of river is prevented—By T. M. Rohan.

◆ WITHOUT water, industry couldn't conduct even simple operations. The steel industry not only uses plenty of it but also must see to it that the water it returns to nature is fit for humanity. Actually, shortages of water are preventing any real industrial growth in some areas of the country.

Armco Steel at Middletown, O., last week was hitting high gear on a $1.2 million recirculation and settling basin system for greater utilization of its well water, which fell 3 million gal short of the 11 million gal daily requirement. This is the mill's only major source of clear water for use in sheet mills, pickling lines and other operations. About 21 million gallons daily are taken from the Great Miami river, a tributary of the Ohio 3½ miles away but its pollution does not permit use in all operations.

Will Get Worse

An engineer at Arthur G. McKee, Cleveland plant designers and constructors told THE IRON AGE "We have been struggling with the water problem for years on new and expanded plants. At the moment it is being shoved in the background in most cases but will become more critical."

In Ohio, industries have voluntarily filed for permits with the Water Pollution Control Board of the State Dept. of Health. Renewal of permits is generally contingent on continued progress in eliminating the pollutants but all has been on a cooperative basis. For steel mills about a half dozen are necessary including sanitary waste, solids, flue dust, waste pickle liquor and others.

Republic Steel at Gadsden, Ala., gets its water from a river 6 miles away through an 8 ft, 60,000-gal per minute pipe installed some years ago.

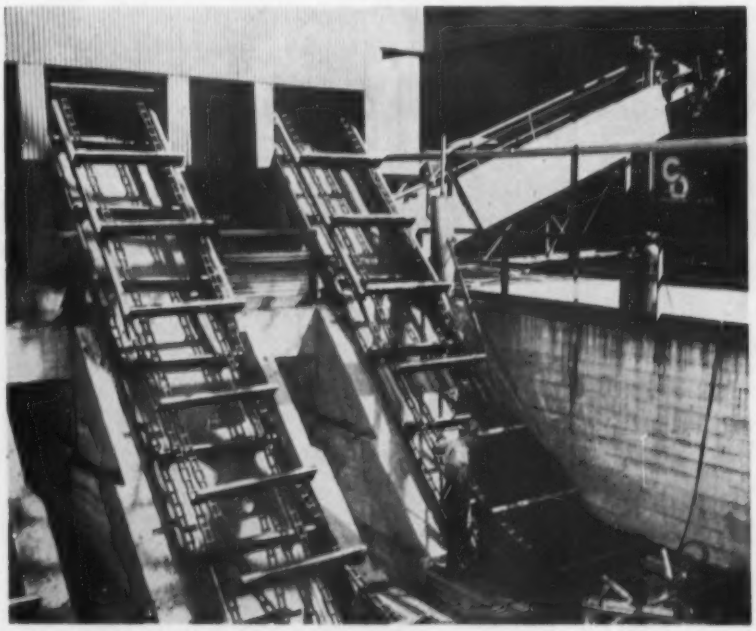
One of the biggest water problems in years was U. S. Steel's Fairless Works at Morrisville, Pa., on the Delaware river with a whopping consumption of 250 million gal per day. This necessitated three separate water systems. About 230 million gal are drawn from the brackish Delaware river. This water is passed through bar racks and screens into wells and then a settling basin for 80-minute retention.

The whole system can be bypassed if water is clear enough but intermittent chlorination is used to prevent slime accumulation in the condenser system. About 15 million gal per day for special purposes is taken from caissons sunk in the ground. For the necessary 5 million gal drinking and sanitary water, an entirely independent well system was necessary and water from all three must be re-treated before returning to the river.

Prohibit Pollution

Although steel mills, utilities and others generally return water to rivers cleaner than they took it out, heavier-polluting industries are at the mercy of an outraged citizenry. Federal legislation against pollution was set up 7 years ago and most Midwest states have their own laws, in many cases more stringent than the national provisions. Paper mills in Wisconsin, for instance, faced closure unless they complied.

Armco this year will be the first plant in its area to install a settling and clarifier system.



CONVEYORS at Armco's Middletown Works scrape mill scale from bottom of settling pool, send it to sintering plant for reuse. Water recirculates.

PRODUCTION

TINPLATE: Producers Eye Capacity

Steelmen ponder need for more tinplate facilities . . . Uses expanding . . . Population growing . . . May set new record in '55 . . . But Far Eastern supply, possible alternates cloud picture—By *J. B. Delaney*.

◆ SPURRED by strong domestic and export demand following record-breaking shipments last year, U. S. tinplate producers are taking a close look at their capacity.

Bethlehem Steel Corp. already has announced plans to build two new electrolytic lines as part of a $100 million expansion at Sparrows Point (THE IRON AGE, Jan. 3, p. 69).

Other mills are arguing the pros and cons of installing additional capacity. On the basis of market studies, producers are optimistic. But there are some question marks, too. These include: (1) unsettled conditions in the Far East, (2) research aimed at substituting other coatings for tin, and (3) possible inroads of aluminum.

These three factors are likely to temper the enthusiasm of the industry for new electrolytic capacity.

Trouble in the Far East could have a two-fold effect: It could shut off or reduce imports from our major sources of tin supply; and at the same time it could result in intensification of the so-called "Operation Survival," a program being pushed by American Can Co. to lessen or eliminate our dependence on tin as a coating for cans. This project would substitute another type coating or, through chemical treatment, obviate the need for tin.

Although aluminum applications in canning and closures are limited in the U. S., tinplate producers have a lot of respect for the ingenuity of the aluminum industry. Some European countries have found it economical to use aluminum cans.

Nevertheless, it's likely that there will be further expansion of tinplate capacity.

Last year's experience was a surprise to a lot of people. While overall steel production dropped approximately 20 pct, tinplate shipments were up 5 pct over the previous year, establishing an all-time record.

Final tin mill shipments figures for 1954 were 5,660,366 tons, compared with the previous record of 5,592,000 tons established in 1951. Breakdown for 1954 shows: Electrolytic 3,680,467 tons; hot-dip 1,307,096 tons, and blackplate 672,803 tons.

Current electrolytic capacity is approximately 4,500,000 tons. Official hot-dip capacity is 2.7 million tons, but the trend toward electrolytic in the last 13 years has been such that the hot-dip capacity figure is almost meaningless. Bethlehem's new lines will add approximately 300,000 tons to electrolytic capacity.

May Set New High

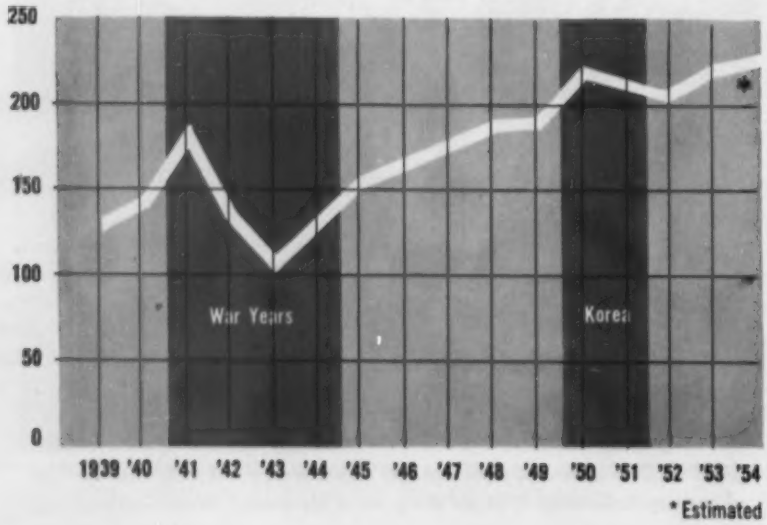
Behind today's booming market is heavy demand from U. S. consumers, plus a strong export demand chiefly from England. The domestic picture is strengthened in part by inventory building as a precaution against a possible strike in the steel industry. Consumers have never recovered from their harrowing experience following the 54-day steel labor walkout in 1952.

The build-up of inventories leads some observers to believe that demand will suffer a letdown in third quarter. But even so, production and shipments are likely to exceed 1954.

For the future, the industry is counting on an expansion of the soft drink market, which last year consumed an estimated 75,000 to 100,000 tons. It looks for higher consumption by the beer and frozen food industries. It sees research booming canned milk use.

Can Consumption Per Capita

(No. 2 Cans)



GOVERNMENT

SECURITY: OK Fifth Amendment Firings

Recent ruling upholds company's right to fire Fifth Amendment invokers . . . Not obliged to negotiate policy with union . . . Industry asks U. S. to get loyalty suspects clear of defense plants—By G. McManus.

◆ THE FIFTH AMENDMENT "does not guarantee that a person who invokes it will not be subject to unfavorable inference" or "shall be continued in his employment." In these words, Federal Court Judge Charles F. McLaughlin okayed the firing by General Electric of persons who invoked the Fifth Amendment.

Discharges did not violate individual rights and the company had a right to set up the discharge policy without consulting the union. On this second point the court held that Communist taint was "obvious cause" for discharge. There was no need to negotiate a policy, no breach of union contract.

The rulings came in a suit brought by United Electrical, Radio & Auto Workers (UE), an independent union expelled from the CIO for alleged Communist domination. UE had asked the Court to declare the company's policy invalid and reinstate members discharged under the policy.

Make No Distinction

This latest action is just one round in industry's running fight for effective security weapons in defense production. Since the start of the Korean fighting, companies have been after the government for clearer rulings and more effective action on security risks.

As it now stands the government tells a company that an employee is not cleared for work in classified operations. That's all. This may mean the man talks in his sleep. It can mean he has a direct wire to Moscow. No distinction is made between the disloyal case and the man who is loyal but unreliable. Both are simply placed in nonsensitive work.

So a potential bomb-thrower may be within tossing distance of vital defense production. He is not allowed in the immediate area but he can be near enough to wreck the place. And he can go bowling with a man who knows the combination to the new death ray.

If a man is a real threat, management feels he should be out of the plant and away from plant people entirely. Once he comes in the gate it's difficult to prevent espionage and almost impossible to stop sabotage. Defense plants want the government to identify and remove men known as likely foreign agents.

In calling for government action, industry representatives point out that a private concern cannot and should not conduct a full clean-up on its own initiative. You can't fire all security risks without hitting innocent people—you're not told the disloyal cases among your risks and no company is equipped to make needed investigations.

And it is not the proper function of a private concern to pass on the loyalty of citizens. This is a job for a government agency and industry wants Congress to authorize an agency empowered to directly remove disloyal persons from defense plants.

Company officials feel they are being held responsible for a situation created by government indecision. Their distaste for policing activities is shown by restrained stands on security cases.

Security in Defense Plants

What's Wrong	Government does not pinpoint loyalty cases among security risks. Possible saboteurs remain in plants.
What's Happened	Hearings have publicized flagrant loyalty risks. Companies have discharged employees invoking Fifth Amendment.
What's What	You can probably make "Fifth Amendment" discharges stick. Job record falsification is considered clear grounds for discharge. You are not obliged to negotiate "Fifth Amendment" discharge policy with union, current rulings indicate.
What's Needed	Government should at least tell industry who the loyalty suspects are. Better still, government should take over the whole job of removing loyalty suspects from plants.

INTERNATIONAL

BRITAIN: Steel Hits New High

Demand continues strong after record tonnage last year . . . New construction will jump output again this year . . . No slump seen . . . Import duties will come off more steel products—By *F. H. Harley.*

◆ BRITISH STEEL output in 1954 was up 5 pct to a record 20,742,400 net tons. Gains were recorded in all sectors of the industry and turn of the year saw demand running ahead of supply. Brisk pace should continue well into this year with expanded facilities upping production to 21,840,000 tons.

Import duties are coming off more items. Duties were suspended on some products last August but the list now covers all types of iron and steel due to be tight. This includes pig iron, ingots, blooms, billets, slabs, bars, rods, joists, angles, sections, plates, sheets, and strip.

Import activity stems partly from British determination to maintain their own foreign markets. Welsh producers are bringing in about 55,000 tons of American tinplate to release their own output for export. There are shortages at the moment but British home deliveries are expected to go up about 5 pct this year and no substantial rise in imports is held likely.

Some Caught Cold

General pattern for 1954 was a slow beginning followed by a strong mid-year recovery as steel shared in the general upsurge of British business. Factors in renewed confidence and activity were the brightening of American prospects, the easing of building restrictions, investment tax relief, and the sharp increase in exports of capital goods.

High steel demands have a solid basis in actual consumption. No serious slump is expected but pressure will be eased when the present restocking move has worked itself out and full production has had time to take effect. The rush of orders last summer caught some steelmakers with cold furnaces and production could not be resumed in time to meet all demands. If orders had been evenly distributed over the year, they could have been filled without undue delay. There is no great disparity between production and consumption rates.

Gains Were Uneven

Last year's recovery varied in timing and extent with different phases of the industry. Alloy steels, reacting slowly, showed little change from the 1953 total, which was down from the postwar peak of 1,271,200 tons in 1952. In line with this slight lag, crude steel production in the Sheffield area showed little increase over 1953.

On the other hand, South Wales, England's big steel producer, showed more than average gains. The Northeast Coast, Lancashire, North Wales, Lincolnshire, and Northants all recorded good gains. Production in Scotland was off slightly.

This variance reflected the uneven progress among consuming industries. Motor car, container, and appliance sales made for heavy demands on sheet steel in flat-rolled grades. Despite a 15 pct production jump and lowered exports, it was necessary to import about 195,000 tons of sheet steel.

Early in the year shipyards, rail car builders and heavy industry in general made heavy demands on the plate steel output. By summer, however, it appeared that production was geared up to requirements, possibly with something to spare.

Facts

Home Deliveries: Rose 1.6 pct in '54; will jump 5.4 pct in '55

Imports: Duties off many items but no big increase seen

The '54 Market: (1) Heavy demand for sheet (2) Strong early demand for plate, then easing (3) Light rolled products made good recovery; shortages in joists (4) Tinplate at high demand level; import duties off (5) Deliveries heavy on rails, heavy sections and bars, wire rods, sheets, strip, tinplate, railway parts (6) Deliveries light on light sections, and bars, tubes, forgings, castings, high speed, tool and magnet steel.

Figures

Production in tons

	Steel Ingots	Pig Iron
1953	19,712,000	12,516,000
1954	20,742,400	13,308,960
1955	21,840,000*	14,100,000*
1957	23,500,000*	.....

* Estimate.

Rails, heavy sections, bars, wire rods, and tinplate showed above average increases. Deliveries were below average on light sections and bars, tubes, forgings, castings, and high speed steel.

Light rolled products started slow, rallied in the summer. Increasing requirements for building members and mine supports caused shortages in joists, particularly in the 5 x 3-in. and 10 x 5-in. ranges. Even with overtime operation and imports, production was behind demand at the end of the year.

Production expansion will continue along the steady lines of Britain's planned development. Output should jump about 5.4 pct in 1955 with expansion directed toward an estimated requirement of 23.5 million tons by 1957.

Pig iron production, up from 12,516,000 tons in 1953 to 13,308,960 tons in 1954, should show a similar gain this year. New blast furnaces are, or will be, in use at Redbourn, Ebbw Vale, Barrow, Bilston, Shotton, Lancashire Steel, South Durham, Dorman Long's, and Margam. The 29-ft furnace at Margam will be Europe's largest.

New ovens at Ebbw Vale, Shotton, Margam, Redbourn, and Guest Keen's Cardiff works will supply added coke. Steel production will be augmented by the 60-ton arc furnace at Samuel Fox's in Sheffield and by Lancashire Steel's new melting shop. Other plants are planning similar extensions.

The new plug mill at Corby will be in full production this year. Coming up during the year are a new tinplate mill at Ebbw Vale; Lancashire Steel's new cogging mill; the new forge at Stewarts and Lloyds' Clydesdale works; the Habershon planetary mill; and the modernizing of the cold reduction mill at Shotton.

India Pushes Steel

Russia will build a 1 million ton steel plant in India with final price to be set in 9 months after a detailed project report which India can reject.

Speaking after agreement signing, Mr. K. C. Reddy, Minister for Production, placed India's 5-year target for steel production at 6 million ingot tons annually, against 1.2 million tons now.

DEFENSE

Alaska:

Army machine does fast job building snow airstrips.

PULVI-MIXER is key to building snow-compacted runways. It churns, melts and drags snow for rollers.

New Army equipment permits construction of snow airstrips in 3 days, recent Alaskan tests indicate. Using a special compacting machine called the "pulvi-mixer," Army Engineers followed up an airdrop landing in snow fields by completing a 5000-ft runway in 72 hours. A standard C-47 plane was able to land safely on the packed snow airstrip.

Key unit in the new technique, the "pulvi-mixer" is equipped with prongs that tear up several inches of snow. Snow is thrown past eight big blow torches and falls to the ground partially melted. Rear drag blade of the machine smooths down the discharged snow.

Heavy rollers compact the damp snow, which freezes into a firm crust. Rollers along with bulldozers and graders were dropped with the 150-man construction crew.

Success of the new technique is considered significant in arctic defense strategy. Speedy construction of runways will greatly increase the striking range of northern air wings.

Defense Funds Enough

Current defense spending is adequate, Treasury Secretary Humphrey declares. He makes it clear that the Eisenhower Administration sees nothing in the Formosa area or anywhere else in the world which requires a second look at the Administration's long-range plans for trimming the $2.5 billion deficit anticipated for fiscal 1956.

Reduced expenditures do not mean reduced defenses, Mr. Humphrey says. "The Defense Dept. has developed a better balanced, more mobile and flexible and effective defense establishment at lower cost to the taxpayers," he states.

Grant Tax Aid

Certificates for fast tax amortization for 54 new or expanded facilities costing $79.3 million are issued in a 2-week period ending Feb. 9 by the Office of Defense Mobilization.

Largest certificates are one for the Port of Chesapeake Authority, 50 pct of $15 million for port facilities permitted fast tax amortization; Miami Oil & Refining Co., 40 pct of $5 million and 65 pct of $6.4 million for petroleum refining facilities; Pennsylvania Railroad Co., 85 pct of $6.9 million for freight cars; Bennett Mining Co., 65 pct of $1.3 million for iron ore concentrates; and the Great Northern Railway Co., 50 pct of $65,000 for iron ore dock facilities.

Bell Gets Contract

First phase of a new Air Force contract with Bell Aircraft Corp., of Buffalo, calls for the company to perform preliminary engineering and build a mock-up of an Army utility helicopter.

Bell's design of its model 212 was selected for further development from among proposals offered by eight aircraft firms. A subsequent contract is to provide for purchase of a limited number of the helicopters for testing.

The 212 is to be a lightweight, single-rotor plane with a closed cabin. It will have a payload of 800 lb, a cruising speed of 100 knots, hovering ceiling of 6000 ft, and a climbing rate of 1500 fpm. Development is to be done at the Bell Helicopter Div. plant in Forth Worth, Tex.

EXPANSION

Aluminum:

Alcoa starts on 65,000 ton expansion at Texas plants.

Confidence in the aluminum market is highlighted by new Aluminum Co. of America expansion plans for its Texas reduction plants. The unique lignite-powered operation at Rockdale and the natural gas-operated facility at Point Comfort are slated for an additional 65,000 tons of annual aluminum reduction capacity. Construction is to "begin at once."

Further evidence of Alcoa's confidence in its ability to sell more aluminum is that the more than $35 million job will be privately financed. Actual plans for the financing, however, are still under discussion.

Another fact made obvious by the 45,000-ton expansion at Rockdale is that lignite has made good as a fuel. While actual costs have never been made public, the net cost per kilowatt-hour is apparently proving competitive with natural gas. Net cost must be considered because Alcoa derives some revenue from sale of lignite byproducts in this plant.

Upon completion of the two new potlines and related facilities, Rockdale's annual aluminum capacity will be 135,000 tons, making it Alcoa's second largest reduction plant.

Point Comfort is slated for one additional potline with a capacity of 20,000 tons per year which will boost this plant to 110,000 tons annually—and water shortages don't have to be considered.

On the basis of "a median-water year," Alcoa officially estimates its current annual capacity at about 650,000 tons. With good water conditions in 1954 the firm actually produced about 665,000 tons.

This makes the new expansion, which is expected to be producing metal during second quarter 1956, approximately a 10-pct boost in Alcoa's capacity. Since there are new producers now constructing plants, it won't mean much of a change in Alcoa's percentage of the entire industry. This is now about 44 pct. Total projected industry capacity, including all plants now under construction or announced, will be more than 1.65 million tons by mid-1956.

Enter Titanium Field

The country's largest aluminum producer last week was preparing to gather its technical know-how for expansion into the titanium forging field. Dr. Walter A. Dean, chief metallurgist of Alcoa's Cleveland Works, was named to coordinate technological developments in titanium for the entire company. At Cleveland Works, where most of the development will be done, a 35,000-ton press and a 50,000-ton press are being installed.

Dr. Dean told THE IRON AGE last week that, in addition to the accumulation of data, the Cleveland Works also has a production subcontract for a moderate number of titanium parts for jet engine compressors and several smaller components.

Mill Site Launched

Site clearance has begun near Ravenswood, W. Va., for Kaiser Aluminum & Chemical Corp.'s multi-million dollar aluminum sheet and foil rolling mill. Clearance operations on the 40-acre plot include preparation of fills, embankments and drainage structures for a mile-long railroad spur track right-of-way. Construction of the 990-ft-long main mill is due Apr. 15.

Plant production is scheduled for mid-1956 at an initial annual capacity of 36,000 tons. Eventual annual capacity of the new plant when completed as a fully integrated rolling mill will be 125,000 tons of sheet and foil products.

Steel: What Mills Shipped in November

As Reported to the American Iron and Steel Institute

STEEL PRODUCTS	DECEMBER 1954 Carbon	Alloy	Stainless	Total	Pct of Total Shipments	YEAR TO DATE Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingots	—2,930	16,270	1,002	16,133	0.3	157,970	139,511	19,183	316,664	0.5
Blooms, slabs, billets, tube rounds, sheet bars, etc.	146,303	37,697	1,091	185,091	3.4	1,180,768	335,219	14,038	1,530,025	2.4
Skelp	9,122			9,122	0.1	129,679			129,679	0.2
Wire rods	78,524	1,593	701	80,818	1.5	741,373	14,632	4,880	760,885	1.2
Structural shapes (heavy)	344,174	3,004	4	347,182	6.4	4,470,988	30,515	80	4,501,183	7.1
Steel piling	27,697			27,697	0.5	387,652	2		387,654	0.6
Plates	357,377	21,446	1,625	420,648	7.7	5,103,772	218,671	17,619	5,340,262	8.5
Rails—standard (over 60 lbs.)	35,813			35,813	0.7	1,113,294	112		1,113,306	1.8
Rails—all other	4,506			4,506	0.1	83,577			83,577	0.1
Joint bars	1,884			1,884		64,304			64,304	0.1
Tie plates	5,150			5,150	0.1	236,011			236,011	0.4
Track spikes	2,705			2,705		65,608			65,608	0.1
Wheels (rolled & forged)	13,268	170		13,438	0.2	191,000	1,483		192,483	0.3
Axles	6,260			6,260	0.1	60,823	133		60,956	0.1
Bars—hot-rolled (incl. light shapes)	483,705	102,315	2,700	618,800	11.4	4,821,149	1,400,513	33,803	6,255,465	9.9
Bars—reinforcing	122,674			122,674	2.3	1,750,957			1,750,957	2.8
Bars—cold finished	88,006	19,764	3,908	121,677	2.2	991,888	179,527	38,078	1,210,273	1.9
Tool steel	1,176	6,289		7,464	0.1	12,620	71,523		84,143	0.1
Standard pipe	166,813	102		166,915	3.1	2,319,686	574	5	2,320,265	3.7
Oil country goods	121,821	34,519		156,140	2.9	1,948,539	342,637		2,291,176	3.6
Line pipe	91,980			91,980	1.7	*2,584,557	16		*2,584,573	4.1
Mechanical tubing	46,414	16,984	346	63,384	1.1	499,745	170,601	3,868	674,214	1.1
Pressure tubing	15,237	2,752	944	18,933	0.3	214,011	46,401	16,796	277,208	0.4
Wire—drawn	211,657	3,514	2,231	217,402	4.0	2,399,966	31,923	20,071	2,420,962	3.8
Wire—nails & staples	31,654			31,654	0.6	567,374		8	567,382	0.9
Wire—barbed & twisted	5,904			5,904	0.1	132,348			132,348	0.2
Wire—woven wire fence	14,231			14,231	0.3	299,917			299,917	0.5
Wire—bale ties	1,626			1,626		51,749			51,749	0.1
Black plate	43,996			43,996	0.8	672,603			672,603	1.1
Tin & terne plate—hot dipped	66,961			66,961	1.3	1,307,096			1,307,096	2.1
Tin plate—electrolytic	200,592			200,592	3.7	3,680,467			3,680,467	5.8
Sheets—hot-rolled	620,524	28,741	2,281	651,546	12.0	5,576,131	283,106	15,037	6,084,268	9.7
Sheets—cold-rolled	1,081,614	3,476	9,947	1,105,237	20.3	9,465,773	42,983	96,926	9,605,680	15.2
Sheets—galvanized	205,561			205,561	3.8	2,361,941	791		2,362,632	3.7
Sheets—all other coated	20,270			20,270	0.4	178,961			178,961	0.3
Sheets—enameling	18,520			18,520	0.3	180,216			180,216	0.3
Electrical sheets & strip	7,634	44,815		52,449	1.0	90,047	498,804		588,851	0.9
Strip—hot-rolled	136,916	2,467	463	159,836	2.9	1,468,357	24,155	3,629	1,486,141	2.4
Strip—cold-rolled	108,804	1,670	18,246	127,820	2.3	1,102,944	11,721	167,328	1,281,993	2.0
TOTAL SHIPMENTS (1954)	4,090,764	408,265	46,497	5,445,849	100.0	*56,934,623	3,765,782	432,391	*63,152,726	100.0
TOTAL—PRIOR YEAR (1953)	5,330,372	319,417	36,081	5,684,920	....	73,732,389	5,017,796	601,706	80,151,893	....

* Revised.

Sciaky patented Three-Phase Welder at Colorcraft, Indianapolis, Indiana.

PRODUCTION COSTS CUT 50%

with One Sciaky Patented Three-Phase Welder

One small, standard Sciaky Three-Phase welder and *one* worker, not skilled, now join more aluminum pitchers and handles for Colorcraft than three workers previously did with screws. Cost per unit is cut in half. Production is increased from 140 to 160 units per hour. Rejects have virtually been eliminated and welds are neater in appearance than screws.

A Sciaky balanced load Three-Phase welder with 85% power factor (compared to 30% for conventional single phase) and a 50% reduction in power demand, is far less expensive to operate than unbalanced load welders. Installation cost is estimated at half that of single phase.

Write today for "Resistance Welding at Work," Vol. 4—No. 3, detailing Colorcraft's story. It's dramatic proof of Sciaky's basic thinking—welders designed for *more useful work* at *lowest operating cost* with *maximum reliability*.

FACTS ABOUT
SCIAKY'S PATENTED THREE-PHASE

	SINGLE-PHASE	SCIAKY THREE-PHASE	SAVINGS
TRANSFORMER RATING	250 KVA	100 KVA	150 KVA
WELDING KVA DEMAND	650 KVA	325 KVA	325 KVA
LINE AMPS PER CONDUCTOR 440 V.	1,476 A.	430 A.	1,046 A.
POWER FACTOR	30%	85%	Greatly Improved
INSTALLATION COST—EST.	$10,500	$5,250	$5,250

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY

Sciaky Bros., Inc., 4923 West 67th Street, Chicago 38, Illinois

GREATER STRENGTH AND LONGER SERVICE LIFE ...THANKS TO *GAS*

This is one heat treating operation at the Construction Equipment Division of the Baldwin-Lima-Hamilton works in Lima, Ohio. In the center of this battery of gas-fired burners is a shipper shaft pinion, soon to become a vital part of a Lima shovel.

The temperature is controlled at 1500°F. After a water quench and a gas-fired tempering process, the teeth and the teeth base of the pinion will have a uniform hardness up to two inches in depth. This means longer service life for this important part.

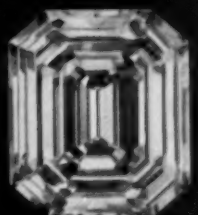
Gas-fired equipment is also used for flame hardening on rollers, gears, and shafts of every Lima machine. Cost conscious equipment men everywhere know that they can depend on Lima for low maintenance and less down-time. Gas equipment, operated by skilled technicians, helps give Lima this world-wide reputation.

Throughout industry, Gas is proving the most satisfactory method of heat processing. That's reason enough for discussing your problem with your Gas Company's industrial specialist. *American Gas Association.*

Here is perfection!

ROEBLING high carbon wire is unsurpassed for industry today. Roebling wire is absolutely true to specifications ...absolutely uniform in gauge and finish. Manufacturers who try Roebling wire once, become Roebling customers from then on.

You *pay* for the best when you buy high carbon wire. Make sure that you *get* it! Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.



The Jonker, world's largest emerald-cut diamond.

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A subsidiary of The Colorado Fuel and Iron Corporation

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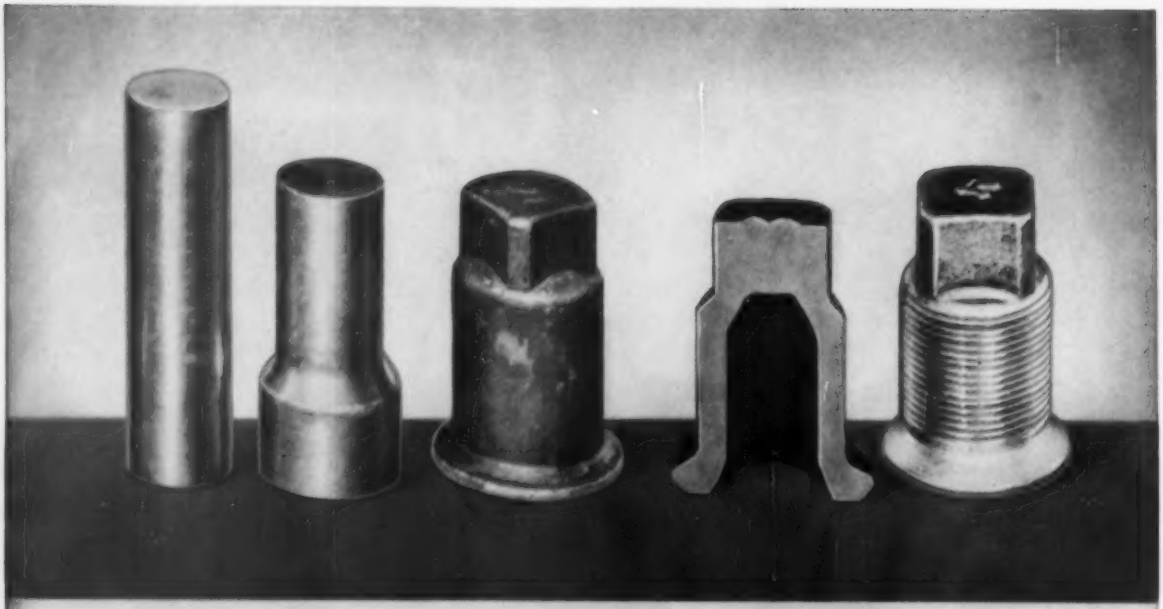


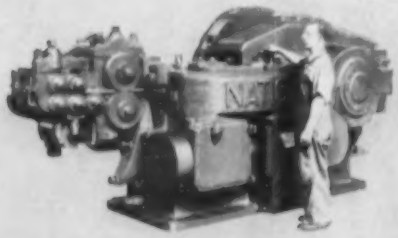
Budd WHEEL NUTS FORGED BY THE MILLION!

This is how the Budd Co.'s progressive Detroit plant has been forging truck wheel nuts by the million, day in and day out, for the past seven years.

In the sequence above, the forging blank is automatically cold headed from coiled hot rolled stock in a National 3/4-inch Double Stroke Solid Die Cold Header. After heating, blanks are forged in a High Speed Forging MAXIPRES of 300 tons capacity.

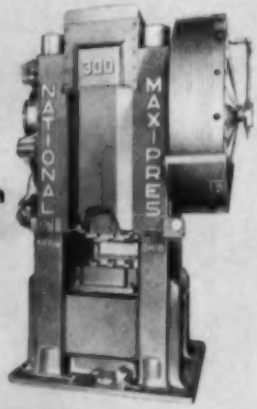
This is one of the first combinations of cold heading and hot forging. Budd has amassed an enviable record of production and material saved by the above method.

If you need to make metal parts faster, stronger and at lower cost, let us work with you. Send us your prints and samples, or better yet, visit us. No obligation.



NATIONAL ¾ in. Cold Header

NATIONAL 300 Ton MAXIPRES



NATIONAL MACHINERY COMPANY
TIFFIN, OHIO — SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCERBILLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

Report To Management

Business Keeps Getting Better

Reflecting the ever increasing tempo of industrial activity, Federal Reserve Board's production index for January climbed one point over the December rating, registering 131. This is the highest reading since October 1953 and marked the fifth consecutive month the index has risen. Since the '54 recession low point, the FRB index has rebounded a substantial 8 points.

What makes the January gain particularly significant is the fact that last year at this time the index dropped one point, slipping to the 125 mark. As has been true for the last several months, activity in automotive and steel were responsible for the January increase.

Adding to the importance of the FRB index jump are latest figures from Commerce Dept. which show that Gross National Product in the final quarter of '54 was running at an annual rate of $362 billion compared with the $355-$356 billion annual rate that held during the first three quarters of '54. Contributing to the jump in GNP (in addition to stepped up steel and auto output) were the declining rate of inventory cutbacks, continued boom in home building, strong consumer demand, increased state and local government expenditures.

See Snag in Highway Expansion

Possible snag in the proposed 10-year, $101 billion highway expansion program could be a shortage of highway engineers. Bureau of Public Roads estimates state highway departments have around 22,000 highway engineers; believes 36,000 will be needed if the accelerated highway program goes into effect.

To forestall a possibility of an engineering shortage bottlenecking the highway expansion program, Bureau of Public Roads recommends state highway departments start training programs to upgrade technicians and subprofessional highway personnel. The Bureau also suggests wider use of standard plans, more aerial surveys, use of short-wave radio so that one engineer can supervise several projects at the same time.

Faster Writeoff Moves Slowly

Industry's acceptance of accelerated depreciation as provided in the 1954 tax revision has been lukewarm. Survey by National Industrial Conference Board of 167 manufacturers showed than only 45 pct of them have changed their depreciation policies.

Main purpose of the accelerated depreciation proposal was to speed up expansion and modernization of plant and equipment, but NICB found that two-thirds of the companies that have changed their depreciation policy say the switch will not affect the volume of their expenditures.

The companies that do believe accelerated depreciation will mean an increase in capital goods expenditures expect to boost their outlays for modernization rather than expanding plant facilities.

The NICB findings bear out reports from manufacturers of capital goods who say they have not received the shot in the arm they anticipated from the tax change.

Reasons firms give for not using the new depreciation method are: (1) value of the equipment involved is small (2) nature of the equipment does not lend itself to accelerated depreciation, (3) apprehension over Bureau of Internal Revenue's interpretation of the new law, (4) desire for stable rate of writeoffs, (5) preference not to gamble on tax rates, (6) satisfaction with previous method.

However, a big factor behind the reluctance to use the new depreciation method is undoubtedly lack of familiarity with the way it operates. Once firms become more familiar with the system it will be used much more frequently.

INDUSTRIAL BRIEFS

Declares Dividend . . . Barium Steel Corp., New York, declared a dividend of 2.5 pct in stock payable Mar. 4 to stockholders of record Feb. 18.

Continues Study . . . Army Ordnance Corps has granted $19,341 to the Mechanical Engineering Dept. at Carnegie Institute of Technology to continue a 3-year study on galling and friction of metals. The project is presently concentrating on titanium.

Awarded Contract . . . Dravo Corp., Pittsburgh, has been awarded a contract by the Pittsburgh Des Moines Co. to furnish two DeLaval multi-stage, motor-driven centrifugal air compressors for the new North American Aviation, Inc., tri-sonic wind tunnel at El Segundo, Calif.

Purchased . . . American Chain & Cable Company, Inc., of Bridgeport, has purchased Allison Co. of Bridgeport. Through this purchase, the company's Campbell Machine Div. is now able to offer more complete service to the metalworking industry.

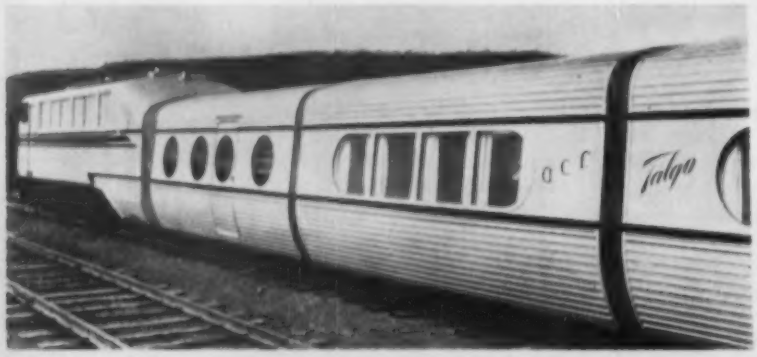
Gets Contract . . . Battelle Memorial Institute, Columbus, has awarded a contract for the design, engineering and construction of a nuclear reactor to the American Machine & Foundry Co., New York.

Congrats . . . Rockwell Mfg. Co. was one of 15 Pittsburgh firms to win top national honors for "excellent management" from the American Institute of Management this year. It is the fifth year in a row that Rockwell has won.

New Agents . . . Plume & Atwood Fabricating Div. has appointed four new agents to service customers of the company's line of metal cosmetic containers.

Appointed . . . The Livingstone Coating Corp., Charlotte, N. C., has been recently appointed southeastern distributor for The Sealube Co., Wakefield, Mass.

To Build . . . Simonds Saw and Steel Co. has just broken ground for a new building on the Banfield Expressway at 66th and Halsey Sts., Portland, Ore.



LIGHTWEIGHT, streamlined, Talgo train built by American Car and Foundry Co. from Spanish design is constructed almost entirely of aluminum. Such applications consumed approximately 3000 tons of aluminum during 1953 and 1954. Railroads are expected to use 6000 tons annually by 1960.

Steps Forward . . . U. S. Steel Corp.'s program for rebuilding the Clairton plant's original 23 coke oven batteries will take a big step forward this year with the completion of three more batteries.

Hear Ye . . . National Twist Drill & Tool Co., Rochester, Mich., has purchased the assets of Staples Tool Co., Cincinnati.

Formed . . . Cemented Carbide Producers Assn. is a newly formed association for the purpose of furthering the use of the products of the industry.

Dividend Declared . . . The Monarch Machine Tool Co., Sidney, Ohio, declared a dividend of 30¢ per share payable March 3 to all shareholders of record at the close of business on Feb. 18.

New Moniker . . . Townsend Co. has changed the name of a recently-acquired subsidiary to Armament Components, Inc. The firm had been known previously as West Coast Tool & Supply Co.

Department Established . . . American Smelting & Refining Co., New York, has established a national Aluminum Department. Allan Nichamin will manage the new department.

Big Order . . . GMC Truck & Coach Div. received its largest individual order for GMC trucks equipped with Twin Hydra-Matic transmissions from Southeastern Motor Truck Lines, Inc., Nashville. The company ordered 90 cab-over-engine, automatic-drive tractors.

Distributor Appointed . . . Ampco Metal, Inc., has appointed Gulf Welding Equipment Co., 1133 Magazine St., New Orleans, as its exclusive distributor in the New Orleans trading area.

Brainard triples electro-galvanized steel capacity to give you faster service

● A new Brainard plant triples capacity for electro-galvanized steel . . . assures you fast service on standard or special orders. Brainard's fully integrated operation, from ore to finished products, gives you a dependable source of supply at all times.

Brainard electro-galvanized steel has a built-in finish . . . plating and finishing costs are eliminated. Coating provides permanent protection against rust and corrosion. Coating thickness can be supplied as specified.

Brainard
SHARONSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION

Find out how Brainard's new facilities assure you a dependable source of supply. Send coupon for free booklet.

BRAINARD STEEL DIVISION
Dept. O-2, Griswold Street, Warren, Ohio
Please send free descriptive booklet on Brainard electro-galvanized steel.

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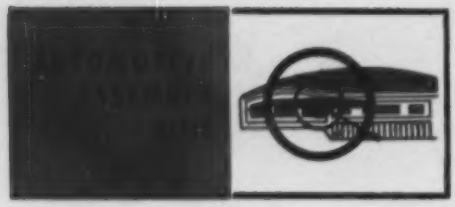
COMPLETE STRAPPING SYSTEMS & MATERIALS • WELDED STEEL TUBING • ELECTRO-GALVANIZED STEEL • SCAFFOLDING • PALLET RACKS • BUILDING PRODUCTS

Offices in principal cities throughout the U. S.



Production Records Ride on Conveyors

Flexible, automatic, power and free conveyor systems link automotive machining, assembly stations . . . Enable tightly scheduled operations throughout plant . . . Save space, time, manpower and money—By *R. D. Raddant.*

◆ AN UNSUNG feature in these days of popularizing feats of automation is the power and free conveyor system. Many engineers believe that without the flexibility and adaptability of power and free systems, today's production records would be almost impossible.

At the very least these records would be more difficult to set without the versatile power and free system. Manufacturing and assembly costs would be much higher and would require many thousands of additional square feet of factory space.

The name, power and free, is almost self-explanatory. Power is transmitted from pushers on power trolleys to free trolleys which carry the load. The power trolleys run on an I-beam track, pushing free-trolleys which operate inside of double channels below.

Eases Load Transfer . . . The main function of the power and free system is that it simplifies transfer between conveyors. The conveyor is loaded at one point, but may have a choice of several destinations. By means of a selector switch, the loader can direct the trolley and its burden to a number of alternate points.

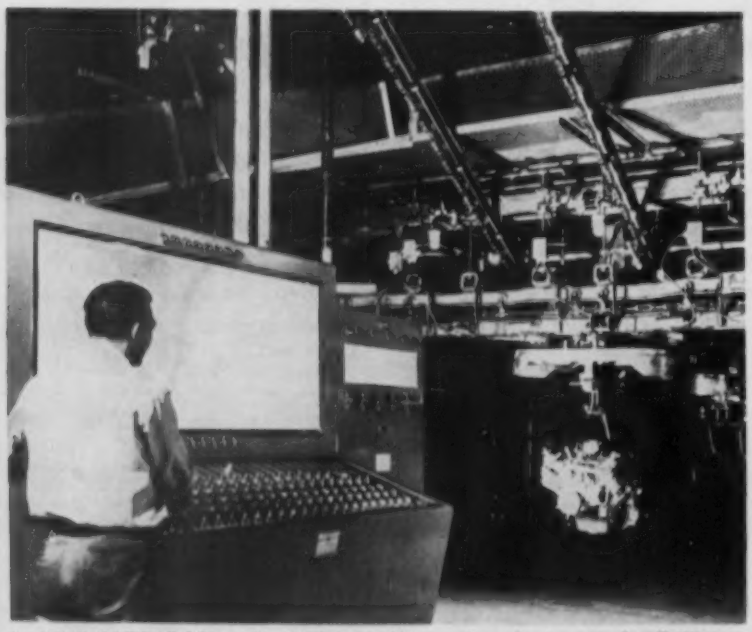
At the same time, a conveyor can pick up a loaded trolley from storage banks, send it to one destination, pick it up again and perhaps deposit the load at a final shipping or unloading point. This is accomplished automatically by making electrical contacts on specially developed, low-voltage circuits.

Although by no means the only maker in the field, Jervis B. Webb Co. of Detroit has designed and installed conveyor systems for a cross section of the industry that shows the broad adaptation of the power and free system.

Have Many Applications . . . An outstanding example is at the new Pontiac engine plant where the final assembly, testing, and loading is all done on a power and free system. The same type of system is adapted to transmissions at Ford's Livonia plant. At the Stewart-Warner plant in Chicago, a power and free system is used to give a 6-floor plant the utility of a single floor layout. At the AC Spark Plug plant, power and free conveyors are adapted to assembly of dash panels of GM cars, solving a troublesome inventory problem in this instance.

The initial function of a power and free system is to perform the simple automatic transfer of a conveyor load from one power line to another, saving a loading and unloading operation. It is particularly adaptable when a load, such as an assembled engine, must be transferred to a different area for testing.

As engines on the conveyor approach the testing stands, they automatically select an empty stand,



SINGLE OPERATOR at Pontiac's new V-8 engine plant controls all 23 conveyor units of power and free conveyor system. All 19,000 ft. of conveyors act as unit; move engines through assembly, test, shipping, on one carrier.

Streamline Design —

and Modern Engineering Techniques are combined in the . . . . . .

BULLARD CUT MASTER
VERTICAL TURRET LATHE

Latest Improvements Include: Model 75

PENDANT CONTROL

Exclusive Bullard design, for maximum machine control from a movable pendant station. Start and stop spindle; selection of speeds, feeds and directional movement of all heads in feed or traverse are quickly and easily accomplished from the Pendant. Interlocks and a stop-all stick provide safety for both operator and machine.

SCREW FEED FOR ALL HEADS

To assure the smooth, accurate, fine finish cutting ability of the new Cut Master Model 75, precision feed screws with adjustable bronze take-up nuts are provided for feed and traverse movement of all saddles, slides and ram. Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

Available in 26, 36, 46, 56, 66 and 76 inch sizes.

ELECTRIC CONTROL PANEL

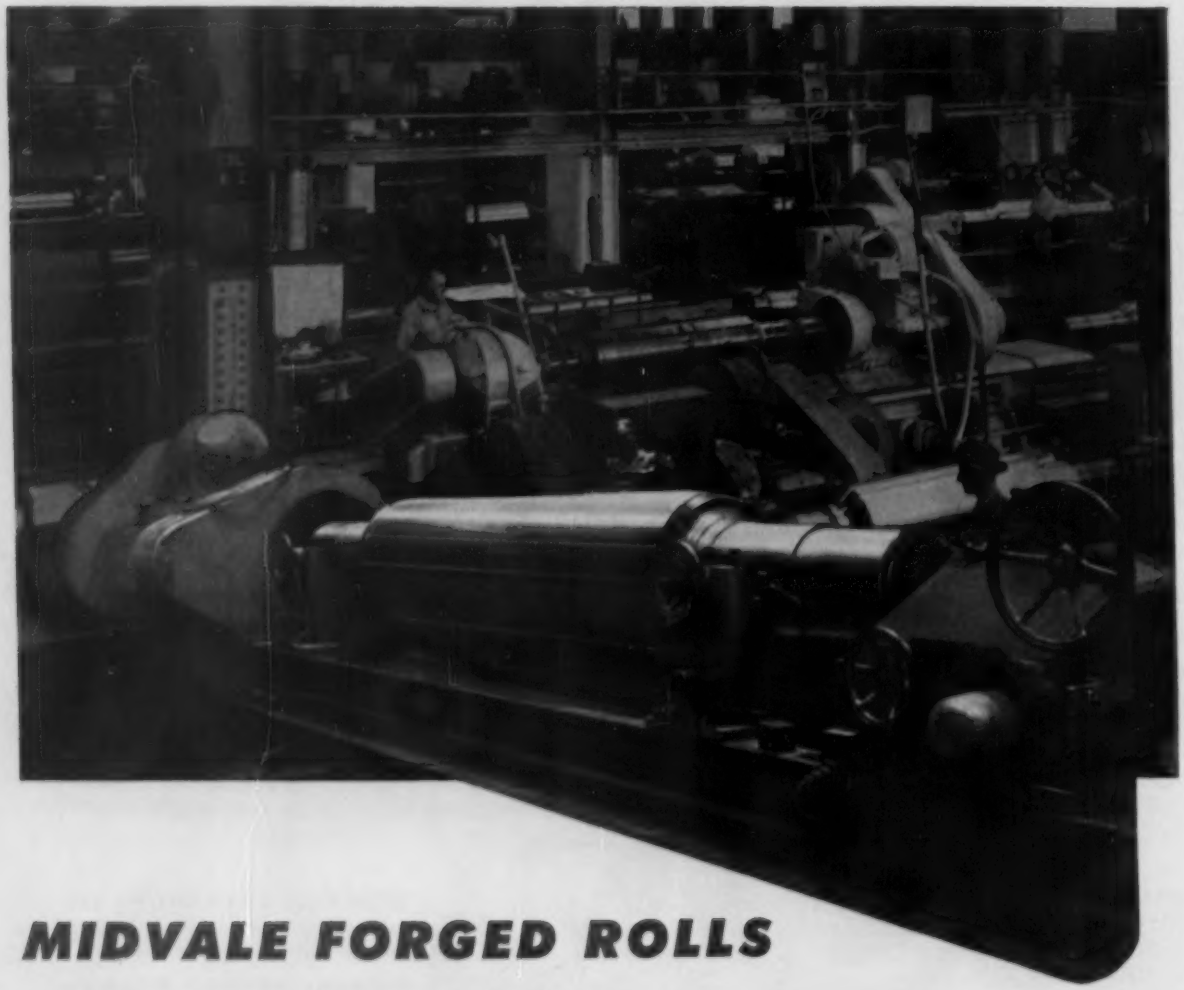
Accessible yet concealed and protected from dust and other foreign matter.

POWER INDEXED MAIN TURRET (Optional)

For Complete information call your nearest BULLARD Sales Office or Distributor or write to . . .

SEVENTY FIFTH 1880 BULLARD 1955 ANNIVERSARY

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT



MIDVALE FORGED ROLLS

TOUGH ROLLS TO BEAT AT THE FINISH

From the furnace to finished grind Midvale Forged Steel Rolls are made with greater durability to provide a finer finish for longer runs.

Half a century of roll making experience skillfully shapes rolls under the right size press for the particular roll . . . produces the maximum in grain refinement. Careful heat treatment gives them the required surface hardness, up to 105 Shore, and endurance qualities underneath. A series of inspections, including sonic testing, approve it for service.

Do you need high quality, longer lasting forged rolls in your mill? Whether they are for strip or sheet mills . . . precision rolling of copper, aluminum or other metals, let Midvale roll specialists show you why you can be sure of a good finish when you start with Midvale Forged Steel Rolls.

THE MIDVALE COMPANY- Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Feb. 19, 1955	182,124	15,942
Feb. 12, 1955	175,353	15,738
Feb. 20, 1954	123,005	25,252
Feb. 13, 1954	117,796	23,774

*Estimated. Source: *Ward's Reports*

are dropped to its level, and, after testing, are picked up and dispatched to the next station. The test stand operator may, by turning the selector lever, send an engine on to shipping areas, or in a case of an unsatisfactory test, send it to a reworking area.

The systems can send a loaded trolley to storage areas, testing stands, loading stations or any station that the particular operation may require. A big advantage is that with automatic drops and lifts, the conveyor line can be kept high except where it is needed at a lower level.

Synchronized With Production . . . Another adaptation is that the conveyor can be fed automatically from different storage banks when a given ratio of production is determined.

Unlike a single continuous conveyor system, the spacing and speed of the conveyor can be changed, going at a slow speed, for example, in assembly, then spreading out at higher speeds for transportation to a different area.

The power and free system was first used in the tire industry carrying trains of tires to and through curing sections. Most spectacular applications today are in the auto industry, particularly in engine and transmission shops.

It is just beginning to scratch the foundry field, but experts in the power and free system say this may be the most fertile field.

Chrysler Shows Profit

Chrysler Corp., the first to report on its 1954 financial history, turned in a small profit of $18,516,770. Modest as it was, it proved wrong those who predicted in Detroit that the company might end up the year in the red.

Encouraging to the company was the exceptional record in 1954's fourth quarter which reflected the excellent reception of Chrysler's 1955 lines. Fourth-quarter sales jumped to $668,672,368, more than double the previous quarter's sales.

Production:

Ford moves California plant; loses only two days output.

This week the Ford Div. launched one of the biggest industrial moves in history to transfer its Richmond, Cal., assembly operations 51 miles to a new "cornfield" plant at San Jose.

The move, starting Thursday, Feb. 23 at 3 p. m., is expected to be completed in time for assembly operations to get under way Monday, Feb. 28. At the most, only two days of assembly operations are to be lost. Many of the 98 pct of the Richmond plant's 1800 employees who will make the transfer will pick up overtime checks for participating in the move.

To complete the transfer of assembly facilities, up to 90 truck and 150 rail car loads of tools, production materials, and office equipment will have to be cleaned, labeled, loaded and hauled to the new plant. In most cases, trucks will be loaded with material from a single department. It will proceed right into the new plant to unload at the spot designated for the department. Banks of subassemblies have been made at Richmond and some sub-assembly operations will be moved ahead of final assembly.

Plan Year Ahead

Coordination of the move began last year and extended from California to production control organizations at Dearborn. Changeover dates were fixed all along the line when engine, frame, stamping and other manufacturing plants east of the Rockies began diverting parts to San Jose.

The Richmond management was split between the two plants and in mid-February workmen began to load new conveyors and stock storage areas with production materials. The Richmond operation continued at an average daily output of 350 cars and trucks.

THE BULL OF THE WOODS — **By J. R. Williams**

YOU GUYS GOT DANDY PLEASURE CARS PUT UP IN MOTH BALLS, BUT FER WORK YOU BUY OLD WRECKS! DASHIN' IN BEFORE YOU'RE LATE -- I'LL GIT IT IN! I'VE GOT EIGHT HOURS YET!
YOU'RE GETTIN' CRUEL, POP -- YOU USED TO COME A BLOCK TO HELP US!
BORN THIRTY YEARS TOO SOON
J.R. WILLIAMS
2-25

Destined to make an outstanding record

in reducing costs

NEW CINCINNATI HyPowermatic MILLING MACHINES

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THIS WEEK IN WASHINGTON

Formosan Crisis Stalls Tax Cuts

New tension checks Democrats' plans for income tax reduction . . . Adminstration goes slow on renegotiation action . . . Aid for small business pushed; defense plant security centralized—By G. H. Baker.

◆ FORMOSAN TENSION has taken the bloom off the Democrats' budding plans for voting lower income taxes. Tax cutting in times of crisis could be termed an act of "fiscal irresponsibility," and Democrat leaders now question the wisdom of ramming through a tax-reduction bill, even though they've got the votes to do so.

This means that nearly all Democrats will now join with the Republican minority in carrying out President Eisenhower's request for continued high excises, and for an extension of the 52 pct tax rate on corporation income. A few will abstain from voting reductions in income rates, under present plans.

Early last month, many Democrats had planned to short-circuit Republican plans for cutting personal income taxes in 1956 (an election year) by grabbing the tax-reduction ball this year and running with it. This plan promptly ran into the opposition of Sen. Harry Byrd, D., Va., who let it be known he would keep any such bill bottled up in his Senate Finance Committee. Sen. Byrd is opposed to lowering income taxes while the budget remains unbalanced.

Not A Must . . . Renegotiation of defense contracts may be revived this year by the Democrat-controlled Congress, but it certainly isn't on President Eisenhower's list of "must" legislation. The White House has adopted a "hands off" attitude on the matter.

Many congressmen believe that over-zealous government renegotiation officials can and sometimes do impair the ability of defense contractors to schedule plant expansion and improvement. And many firms have become increasingly wary about accepting any more government business in the future, as a result of expensive renegotiation deals.

Democrats generally don't want the renegotiation issue to die. They count it as a good political issue. They want to be able to harp on "excess profits reaped by industry," and the "need for taking the profit out of war."

Both the Senate and the House are considering bills to extend renegotiation retroactively from Jan. 1, 1955 (date the old renegotiation law expired), through Dec. 31, 1955. Sen. Dworshak, R., Ida., and Rep. Carrigg, R., Pa., are among the sponsors of the proposal.

Seek SBA Expansion . . . Sen. Sparkman, D., Ala., who heads the Senate Small Business Committee, is busy button-holing colleagues in support of his plan for building up the Small Business Administration as a powerful and independent lending agency.

"We've checked your character references, Pendexter, but all we found is that you're a character."

At the present time, the SBA is prohibited from making loans of more than $150,000. Sen. Sparkman wants to boost this limit to $500,000.

In addition, Mr. Sparkman intends to see to it that the SBA remains a so-called "independent agency"—that is, free from the control of existing departments.

Nearly all Democrats and many Republicans support the Sparkman plan. They see in it an opportunity to keep their hard-pressed constituents provided with business funds. They haven't forgotten how the now-defunct Reconstruction Finance Corp. was a political gold mine in that it handed out loans on a lavish scale to nearly every citizen who had "connections" at the Capitol. By building up the SBA's power and authority, they hope to build up another such lending "empire."

Speed Security Action . . . Key industrial employees who need security clearances in order to work on classified military contracts are being promised faster service by the Defense Dept.

By mid-April, the Department intends to put into effect a revised Industrial Personnel Security Review program providing for central handling of the screening job. The idea behind this move is to reduce the number of employees denied clearance and thus lower

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the number who must get a hearing.

The revision follows a detailed security system study begun by the Pentagon last summer. A director will be named by Defense Secretary Wilson to head the changed program.

Regional hearing boards will continue to operate, with headquarters in New York, Chicago, and San Francisco. Special hearing panels, prepared to travel to various localities, will be set up to insure prompt hearings.

Experience gained by the regional hearing boards established in 1953 is to be pooled under the revised program and incorporated into the handling of all cases. A central review board in Washington will examine unusual cases and those wherein a split decision is made by a hearing board.

Tax Refund Due

Supreme Court ruling that manufacturers are entitled to excise tax refunds for expenses in repairing products covered by insurance is expected to cost the government about $100 million in tax refunds.

Government is now liable for an estimated $27 million for 1954, and the flood gates are open for refund requests by some 19,000 manufacturers of articles subject to excise taxes during the last 4 years, Justice Dept. says.

The Supreme Court refused to review original ruling by the U. S. Court of Claims which found several months ago that Frigidaire Div. of General Motors Corp. was entitled to a $240,000 tax refund for expenses in connection with warranty work it performed on its appliances from 1937 to 1941.

Industry at A-Test

Industry, including a number of metal working firms, will participate for the first time this April in an atomic bomb test. The test, termed an "open shot," will be conducted by the Atomic Energy Commission at its Nevada proving grounds. It will be one of a series of atomic explosions beginning late this month.

Several hundred civil defense workers will observe the results of atomic violence against a residential community; several steel and aluminum industrial buildings; and new types of shelters and utility installations.

Industry observers will be able to inspect some of the test structures before and after the shot, but they may not use results in advertising.

Atoms:

AEC pushes atomic uses with new school, policy talks.

Atomic Energy Commission is stepping up its program for promoting peacetime use of nuclear power. Recent moves are directed at setting up workable policies and securing broader understanding of the whole field.

Proposed licensing regulations and policies to be instituted under the Atomic Energy Act of 1954 will be examined by electric utility officials at an early meeting with government personnel in Washington.

Consults Industry

AEC, which is calling the conference for late February or early March, has invited 17 electric utility executives to attend. AEC hopes to get helpful suggestions from the conferees regarding the proposed regulations. Both publicly-owned and private power companies are to be represented at the meeting.

The agency intends to consult with representatives of other industries at similar conferences before issuing the regulations. New rules will be published 30 days prior to the date on which they become effective.

School of Nuclear Science and Engineering opens on Mar. 14 at Argonne National Laboratory, Lemont, Ill., with more than 30 students from 19 foreign countries and up to 12 industry-sponsored American engineers and scientists comprising the initial class.

Cost of the tuition is $1500 per student, to be paid by the sponsor. Names of the class members will be revealed by Atomic Energy Commission within a short time.

Sees Atomic Era

Length of the first course, which AEC says is designed for beginners in the atomic energy field, is to be 7 months. Each student is required to have a bachelor's degree, or its equivalent, in a physical science or in engineering.

By 1965, says Dr. George Manov, AEC industrialist specialist, one out of every 10 new power plants built will be nuclear powered. By the year 2000, atomic power plants are to number half the new generating units constructed.

"No point in being pessimistic, Jones . . . maybe there won't be another layoff."

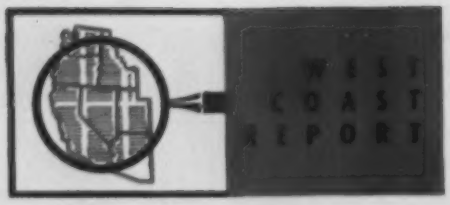
WASHINGTON NEWS

Set Writeoff Deadline

Time limits for reaching 10 expansion goals in the transport field are extended by a new office of Defense Mobilization action.

ODM now designates Dec. 31 as the final date on which a company will be eligible to get fast tax amortization benefits by beginning production or construction in the following categories:

Great Lakes ore carriers; specified types of inland waterway vessels; diesel locomotives; freight cars; railroad passenger cars; railroad terminal and road facilities; warehouse and storage facilities; motor truck and terminal repair facilities; inland waterway terminal facilities, and port facilities.



Fast Growth For Reinforced Plastics

Plastic pipe totalled 30 million lbs last year . . . A six-fold increase since 1950 . . . Predict pipe output 80 million lbs annually in five years . . . California firms make 25 pct of reinforced plastics—By *R. R. Kay.*

◆ REINFORCED PLASTICS today is a whopping $400 million industry. And it's growing phenomenally.

Setting the pace are some 50 California companies, which produced $100 million in reinforced plastic products in 1954—25 pct of the industry's total.

More than 1000 men came to the 10th Annual Technical and Management Conference of the Reinforced Plastics Div. of Society of Plastics Industry. The Los Angeles meeting was the first held on the West Coast.

Pipe Production Zooms . . . Thirty million pounds of plastic materials went into all types of piping in 1954—a six-fold increase over 1950. By 1960, assuming a constant rate-of-gain, piping will consume 80 million lbs per year. That's the prediction of George A. Stein, of A. O. Smith Corp., Milwaukee.

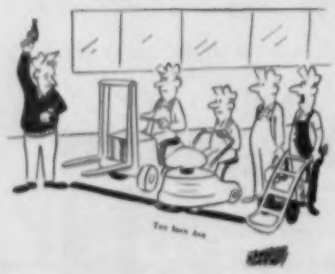
Today, reinforced plastics comprise 10 pct of the total which, by 1960, would amount to eight million pounds. But, Mr. Stein says, with technology developing as fast as it is, there will be even greater demand for reinforced plastic pipe.

Seek Petroleum Business . . . Reinforced plastics men are casting an eager eye at the petroleum industry. Oil fields and refineries consume an impressive 60 million feet of pipe per year. Projected use estimates of 400 million feet per year by 1960 present an exceedingly attractive piece of business for reinforced plastic pipe manufacturers.

Market analyses show possible uses for plastic pipe in aircraft ducting, electrical conduit, gas transmission lines, industrial piping, irrigation, military (containers, missiles, ships), oil fields and oil production, and water transmission. Other possibilities are constantly turning up. (See THE IRON AGE, Oct. 28, 1954, p. 41.)

Consider Airframe Uses . . . Of total airframe weight delivered during 1954, just about 1 pct was in reinforced plastic products. But now there's a definite trend toward primary structural applications rather than only secondary structures and equipment items. This will require airframe manufacturers to build-in such structures as radar housings.

Potential stumbling block to faster development of reinforced plastics for aircraft application is lack of testing methods, primarily non-destructive testing of finished components. With the frequent introduction of new plastic materials, this lack could soon become serious.



"This new foreman really dramatizes start of each shift."

Get Better Tooling . . . There's also a trend toward better tooling for plastic parts. Matched metal dies are more in evidence than vacuum bag techniques. This is particularly true in tooling primary structural parts where the end product must have close dimensional control.

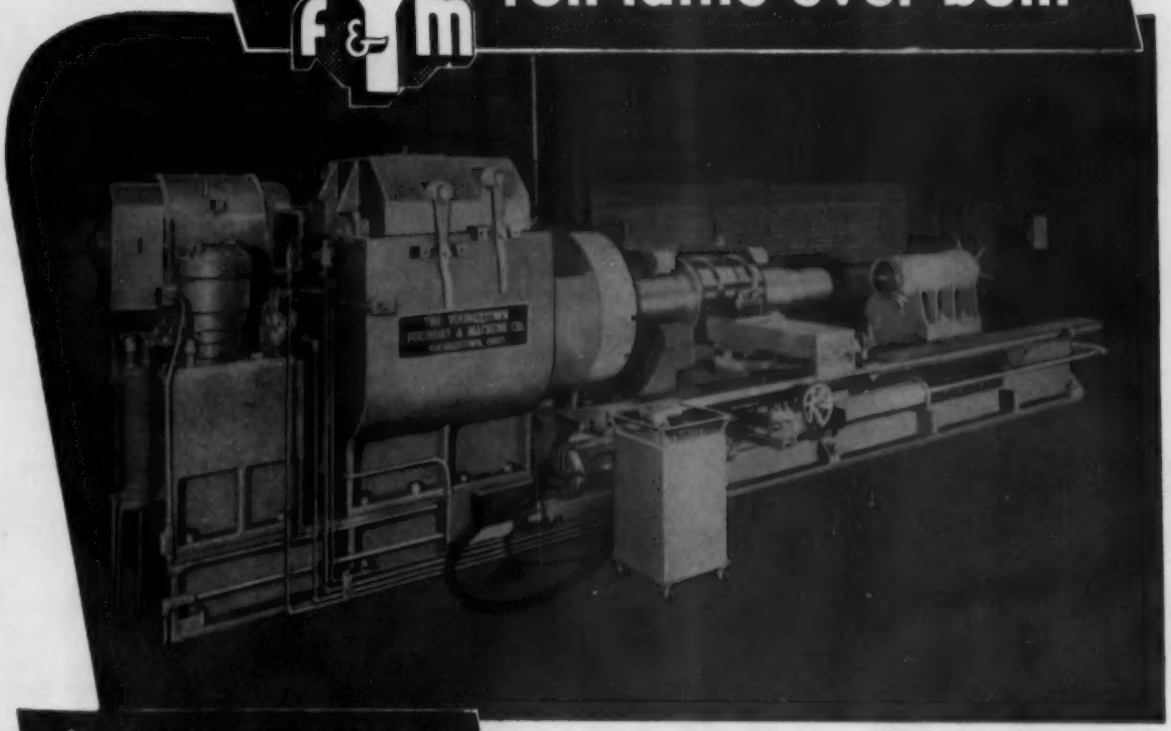
The reinforced plastics industry would do well to establish a standard method of obtaining tool costs. Here's a suggestion from John C. Moricoli, Plastic Mold Div. of The C. L. Gougler Machine Co., Kent, Ohio: set up a standard mold data information sheet to be supplied by the molder to the mold maker whenever the molder requests a quotation on a tool. Such a data sheet would make a definite working base. Tooling costs would drop with earlier work starts.

Develop Auto Applications . . . Automotive people at the SPI meeting talked about more and more limited production type applications: ambulances, station wagons, fire engines, and trucks. One engineer suggested that yearly style changes in trucks could be feasible with reinforced plastics.

Other economical applications are in fabrication of specialized delivery trucks and fleet production. The heavy trucking industry is another potential field for reinforced plastics. Lightweight body panels and cabs would mean increased payloads for carriers.

Announce Expansion . . . Norris-Thermador Corp., Los Angeles, expects to put up one million dollars for two plants in Walnut, Calif. (San Francisco Bay Area).

NOW the most efficient * roll lathe ever built



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* Tool post and carriage designed to use either single point carbide-tipped tools or regular roll turning tools

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You can turn rolls *better...*
either on necks or centers

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New "YOUNGSTOWN"
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Outstanding in performance! Tested! Proved! This lathe, originally developed and perfected for turning in our own roll shop, turns rolls either on necks or centers. Speed range .75 RPM to 53.5 RPM. Roll capacities: 6" minimum diameter, 36" maximum diameter, with 11'6" maximum length (subject to alterations to suit your specific needs). Your next Roll Lathe if you want the best.

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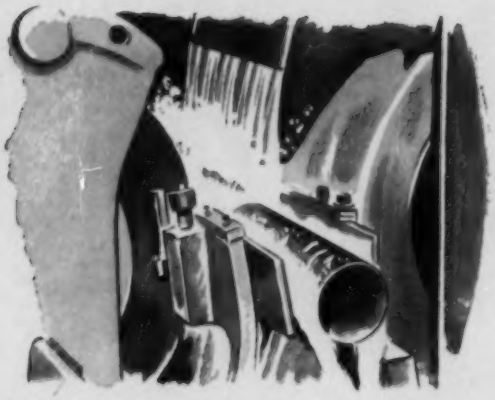
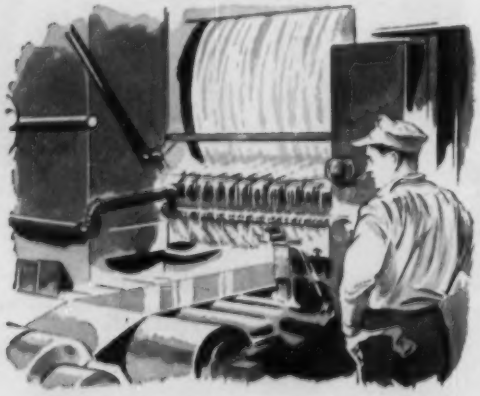


GRINDING WITH NEW S.E.C.O. Surface finishes are good. Loading and glazing of wheel are reduced—wheel life is prolonged.

WASHING WITH NEW S.E.C.O. Thorough removal of grease and dirt provides clean surfaces for smooth, long-lasting finishes.



ROLLING WITH NEW S.E.C.O. Rolls stay clean. You get maximum reductions and low power consumption.

New Sunoco Emulsifying Cutting Oil increases production, cuts operating costs. Its high machining efficiency permits uniformly good finishes, prolongs tool life. Its high detergency and purity keep tools, parts and machines clean. Its excellent mixing qualities permit its use in cold, hard or hot water. Test New S.E.C.O. in your own plant. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-2.

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MACHINE TOOL HIGH SPOTS

Predict Faster, More Accurate Tools

Bearing makers, tool engineers cooperate on research . . . Plan for higher operating speeds, closer tolerances . . . Will utilize new, improved grinding and cutting devices in future tools—*By E. J. Egan, Jr.*

◆ MACHINE TOOLS of the future will have to (1) operate at higher speeds; (2) produce more work to closer tolerances; (3) produce better surface finishes; (4) handle new, tougher alloys; (5) operate with less maintenance and downtime.

The man who made these predictions is in a good position to know what he's talking about. He's H. A. Offers, Ass't General Sales Manager, New Departure Div., General Motors Corp. His company produces four ball bearings every second of the working day, uses a wide variety of modern machine tools to do the job.

Discuss Bearing Problems . . . It's fundamental that better bearings help to make better machine tools, and vice versa. To discuss their mutual problems and objectives, New Departure invited machine tool design and development engineers to a two-day conference in Hartford, Conn., last week.

Opener of the conference's six panel discussions centered on ball bearing requirements for machine tools of the future. Mr. Offer's keynote talk for this first session included the above predictions. He said that bearing research would parallel that of machine tool engineers in each forecast area.

The speaker said that higher machine tool speeds would make possible full utilization of improved grinding wheels and cutting tools for fast, low cost stock removal. And in detailing his second prediction, he said, "The problem of fits and parts interchangeability is nothing but a direct relation of closer production tolerances."

Better Finish Quicker . . . Future machine tools will produce better finishes, resulting in reduced cycle times and costs, he continued. Better bearings and seals will help minimize chatter, even at difficult feeds and speeds.

Machine tools of the future must have the ability to handle tough new alloys efficiently. "The research metallurgist has many wonders up his sleeve which will remain a laboratory curiosity until they can be machined and finished efficiently," he said. Jet engine and atomic energy temperatures are going higher, he maintained, and alloys to match these conditions will present difficult machining problems.

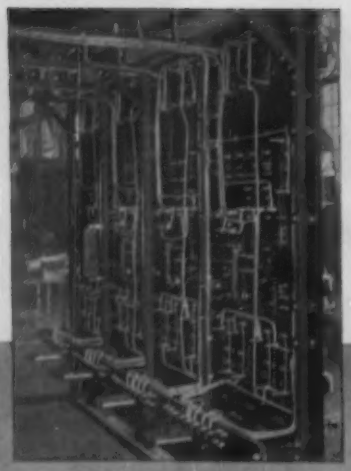
"To Alec it's more than just a job."

Last but not least, future machine tools will operate with less servicing and downtime, Mr. Offers predicted. "An idle machine or spindle produces no profit and upsets manufacturing schedules," he said.

Try New Metals . . . F. J. Garbarino, New Departure's chief engineer, answered a timely query about possible new bearing materials or processes to withstand heavier future loads. He said that vacuum melted 52100 steel showed better endurance life than the same alloy melted by conventional practice. Fewer inclusions in the vacuum-melted material mean less residual stress and better fatigue life in products fabricated from it.

Machine tool engineers tossed a few hot questions at the bearing experts. Builders would like to see ball bearing outer races made to closer tolerances, but at no increase in cost. Their contention: Closer fits between outer races and bearing housings would help control bearing creep, improve machine tool accuracy and trouble-free performance.

Seek Multipurpose Grease . . . Conferees also discussed ball bearing lubrication at some length. Machine tool users should be glad to hear that the search for something like an all-purpose grease lubricant is very active. If successful, the wizard grease would eliminate the need for much of the expensive oil lubricating equipment on machine tools. Constant research on new grease additives keeps this hope very much alive.



Back of panel shows accessibility of terminal blocks and neat grouping of wiring.

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Quick-quenching arc-centering blowout solves problem of contact burning by sharply curtailing arcing time.

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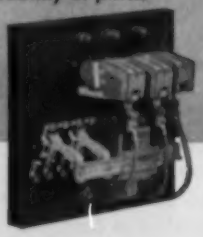

Type 522 Contactor

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(Advertisement)

information memo from the engineering laboratories of CONSOLIDATED VACUUM CORPORATION

CVC

Volume 1 Number 1

HIGH VACUUM METALLURGY

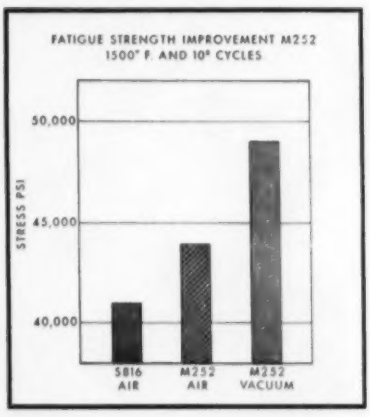
A new technique

High vacuum metallurgy is opening a new frontier for the metals industry.

High-purity metals and high-temperature alloys having physical characteristics far superior to air-processed metals are now produced commercially in high vacuum. Volume production has risen from poundage to tonnage in less than five years' time.

The value of vacuum-processed metals can be illustrated with a high-chromium stainless steel alloy whose impact strength at room temperature is increased 50 to 1 over the same air-melted alloy.

The increase of fatigue resistance of another alloy is shown graphically below. Fatigue resistance, rupture strength, tensile strength, tensile ductility, and forgeability are a few of the characteristics noticeably improved by vacuum processing.



The strength of a metal or alloy depends to a considerable extent upon the kind and amount of impurities it contains —impurities such as oxygen, nitrogen, carbon, or other unwanted elements which are inherent in the metal or which the metal picks up from the air or from the crucible.

High vacuum metallurgy produces metals and alloys wherein the level of contamination by such impurities is considerably reduced. It gives . . .

1. closer control of the alloying elements throughout the processing cycle;

2. separation of undesirable gases and other contaminating elements from the melt;

3. alloys and metals which are impossible or impractical to produce in air or inert gas.

End products show marked improvements in such operations as annealing, sintering, soldering, brazing, outgassing, distillation, refining, as well as melting and casting.

Large-capacity pumping is the key to production economy

A high vacuum furnace is no better than its vacuum pumping system.

A pumping system is rated on its "throughput" and its ability to handle "gas load."

Throughput is the quantity of gas flowing through the high vacuum pumps in a given period of time over a given pressure range. Double the speed of these pumps and the throughput of the system is also doubled.

Gas load is the quantity of gas to be removed from the furnace in order to create and maintain the gas-free atmosphere required throughout the processing cycle.

Initially, the vacuum furnace is exhausted with a mechanical pump. This "roughing" operation removes the greater portion of the gas present at the start of the cycle. When the mechanical pump has reduced the pressure to the practical limit of its capacity, the high vacuum vapor pump is used because of its large pumping capacity in the low-pressure region. A properly designed system will reduce the pressure in a furnace to one 50-millionth of an atmosphere in a matter of minutes.

If it were only necessary to remove the original gas load in the furnace chamber, it would be simple to calculate the proper capacity of the pumping system. Gas load, however, is not a static condition. The operations and reactions that occur in the furnace during the heating and melting cycle cause numerous surges in pressure.

Basically, these are the contributing factors:

1. entrapped gases that rising temperatures release from the chamber walls, the crucible, molds, and other in-vacuum surfaces;

2. outgassing from the main charge and alloy additions;

3. reactions between melt and crucible, and between insulation and crucible;

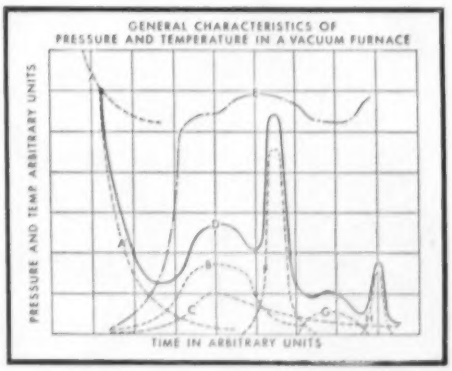
4. intended reactions such as oxygen reduction treatments;

5. inleakage from any points in the system.

The accompanying graph shows the relationship between these load surges and the resultant chamber pressure.

In order to maintain complete control over the reactions that take place in a furnace, the pumping system must have the capacity to handle these pressure surges with sufficient ease and to return the chamber rapidly to the required operating pressure.

There are other important factors which influence the design of a high vacuum furnace installation; some are technical and some economic. We welcome the opportunity of discussing your high vacuum metallurgy problems. For further information, please contact ***Consolidated Vacuum Corporation, Rochester 3, N. Y.*** (a subsidiary of Consolidated Engineering Corporation, Pasadena, California).



Typical pressure-temperature curves for a high vacuum melting and casting furnace.

A—Mechanical pump evacuation on empty chamber
A'—Vapor pump evacuation on empty chamber
B—Outgassing from metal
C—Outgassing from insulation
D—Resultant pressure
E—Temperature of metal
F—Outgassing of alloy additions and deoxidizers
G—Outgassing due to solubility decrease
H—Outgassing during pouring

Consolidated Vacuum Corporation, ROCHESTER 3, NEW YORK

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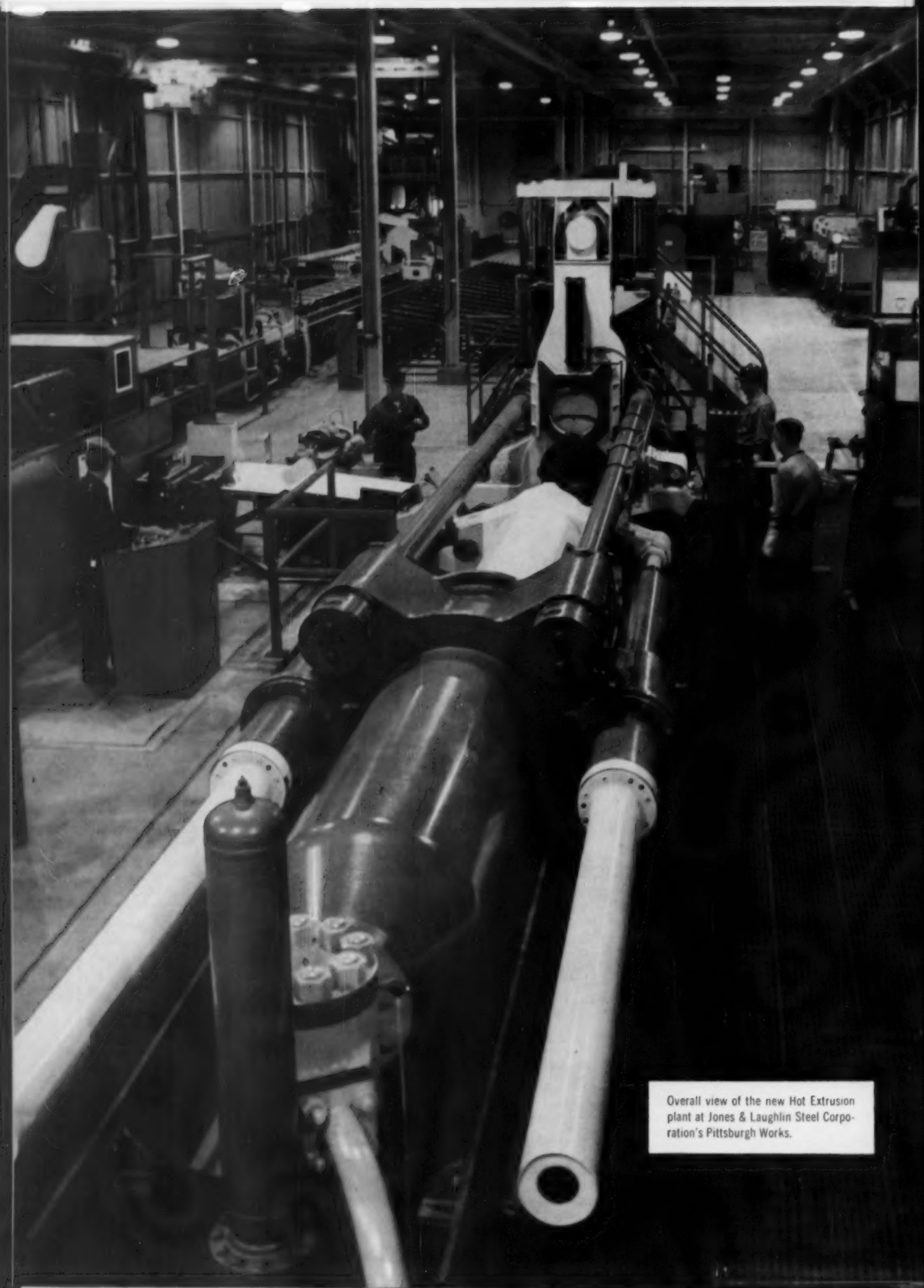

Overall view of the new Hot Extrusion plant at Jones & Laughlin Steel Corporation's Pittsburgh Works.

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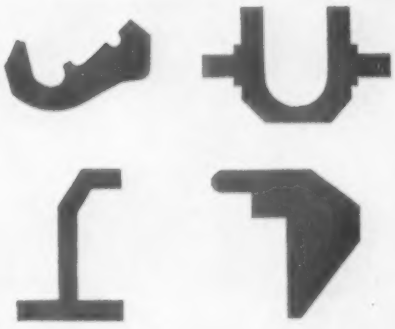
J&L STEEL

Close-up of the 1000-ton hot extrusion press at Jones & Laughlin Steel Corporation, Pittsburgh. Hot billet is being pushed into the die container. The ram then forces it through the die.

Examples of sections that can be produced to your order. More intricate sections are also possible. The section you need is custom-made to your requirements.



J & L's Extruded Sections help speed your production and reduce your costs

With J&L's Extruded Sections you can:

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2. Eliminate time and costs in finishing operations.
3. Reduce scrap losses practically to the zero point.
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FLASH...

GILRON'S DRAWCOTE JOINS PENNSALT'S FAMILY OF METAL PROCESSING CHEMICALS! THE PURCHASE OF GILRON PRODUCTS CO. BY PENNSALT MEANS A FULL LINE OF DRAWING COMPOUNDS, METAL CLEANERS, PHOSPHATIZING COMPOUNDS WITH SERVICE FROM ONE SOURCE.

Pennsalt announces an important addition to its growing line of specialty chemicals and services to the metal working industry . . . the Gilron Products Company of Cleveland, Ohio. All Gilron personnel will continue to be active under the new management.

Established in 1942, the Gilron line features "Drawcote," a dry soap type of drawing compound which, when applied to metal, makes additional lubrication unnecessary before drawing, stamping, forming or cold extrusion.

Pennsalt, by adding Gilron and Drawcote, now has a product line that can serve all types of stamping and drawing shops with new and superior lubrication methods. Drawcote can be used alone for lighter duty draws.

It can also be used with Pennsalt Foscoat for severe draws and extrusions. Yes, Pennsalt now has a complete range of products to fit exactly the needs of most steel stampers and formers.

Remember, Pennsalt's Drawcote and Fos Process give you—

- Cleaner shop conditions!
- Fewer rejects from tearing or scoring!
- Longer die life!
- Better finish on parts!

Call your Pennsalt metal processing specialist for full details. Write Customer Service Dept., Pennsylvania Salt Manufacturing Company, 1060 Widener Bldg., Philadelphia 7, Pa.

Pennsalt Chemicals

SPECIALISTS IN METAL SURFACE PREPARATION

City Zone State

PERSONNEL

The Iron Age SALUTES

Garnet Phillips

He knows most of the answers on metallurgy but he keeps busy thinking up new questions, working with industry groups and chasing problems in foundries all over North America.

Supervisor of foundry research at the International Harvester Co., Garnet Phillips has gained a national reputation for his work with gray iron, contour moulding and nodular iron. He has come a long way but he's not pausing to reminisce.

Garnet continues to grind out ideas at a rapid-fire rate. He keeps all kinds of committees humming. His work with International Harvester sends him hopping around to plants in Mexico, Canada and the United States.

All this activity started back in Prairie Creek, Ind., where Garnet Phillips was born. He received his early schooling in Terre Haute and went on to Carnegie Tech for studies that led to a master's degree in chemical engineering.

Finishing college in 1926, Garnet went with the Frank Foundries Corp., Moline, Ill., as chief chemist. He was later made chief of chemistry and metallurgy. In 1935 he joined International Harvester as metallurgist for the company's automotive foundries.

In 1946 Garnet became supervisor of foundry metallurgical research. In 1949 he was appointed general supervisor of foundry research.

An idea of Garnet's standing in engineering circles can be had from a look at some of the groups that have sought his advice. He has been on committees dealing with iron or steel castings for the American Foundry Society; American Society for Metals; and the Society of Automotive Engineers.

He has served as chairman and member of the board of directors of the Quad-City ASM chapter and is also a member of the British Institute of Metals.

Garnet lives in LaGrange, Ill. He has a daughter, Ann, who recently received her teacher's certificate, and a son, George, who has a B.S. degree in economics.

During his school days Garnet made quite a name for himself as a shoe salesman. Bright things were predicted for him in retail selling but he knew what he was doing in sticking to metallurgy.

'round the clock with

CF&I-WICKWIRE WIRE

In this advertisement we continue to take you through a typical day in the life of John Q. Citizen... showing you the part CF&I-Wickwire Wire plays in his everyday activities.

OFFICE BUILDING—8:55 A.M. John never stops to think about it but he rides up to work on dependable elevator cable. Without this indispensable wire product—much of it made of CF&I-Wickwire Wire—modern multi-story buildings would be unable to function.

OFFICE—9:00 A.M. Here we are, inside John's office. Where is the wire? All around us. Paper clips inside the desks. Springs inside the telephones and the typewriters—even under John's swivel chair. Staples, coat hangers, ring binders—these and countless other office necessities are made from wire—very often of CF&I-Wickwire Wire.

FACTORY—3:00 P.M. Let's accompany John on a trip to his firm's nearby factory. The premises are inclosed by a wire fence. Inside, we find wire mesh cloth used as machinery guards. Metal processing belts made of woven wire. Springs of every variety to keep the machines going. All of these products use CF&I-Wickwire Wire.

Watch for the balance of John's day in our next advertisement which takes John back to his home and the relaxation of his living room.

For the Wire You Require—Check CF&I-Wickwire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston
Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Wichita

2692

The Iron Age INTRODUCES

Rainey Elliott, named president, Supply Div., **Jones & Laughlin Steel Corp.,** Tulsa, Okla.

Lewis H. Whitney, elected vice-president, **Whitney Chain Co.,** Hartford.

C. M. Basile, named vice president of manufacturing and sales, **Link-Belt Speeder Corp.,** Cedar Rapids, Mich.; and **Gordon W. Rowand,** promoted to sales manager.

Howard C. Parkman, named assistant vice-president-operations, Niagara Falls plant, **Vanadium Corp. of America; R. T. Bailey,** named assistant to the vice-presiden-production manager.

B. J. Osborne, appointed assistant to the vice-president and general manager, **Kaiser Steel Corp.** and placed in charge of the new Fabricating Div.

Warren H. Brand, elected vice-president in charge of engineering and research, **Conoflow Corp.**

Wilder D. Baker, named director of public relations, **Solar Aircraft Co.,** San Diego.

John K. Northrop, elected as a member of the board of directors, **The Garrett Corp.,** Los Angeles.

J. M. Vinicombe, Jr., appointed director of industrial relations, Pesco Products Div., **Borg-Warner Corp.,** Bedford, O.

Clarence B. Sampair, elected to the board of directors, **Minnesota Mining & Manufacturing Co.,** St. Paul, Minn.

E. L. Maguire, appointed to direct the sales of all fabricated metal products of the Walsh Holyoke Div., **Continental Copper & Steel Industries, Inc.**

Joseph V. Delaney, appointed general manager, Columbia Div., **Lodge & Shipley Co.,** Hamilton, Ohio.

A. J. Lamond, appointed manager of packing sales, Quaker Rubber Corp., division of **H. K. Porter Co., Inc.,** Phila.

Frederic L. Moffet, appointed chief metallurgist, Park Works, Pittsburgh, **Crucible Steel Co. of America.**

William H. Kinney, appointed resident metallurgical engineer, **Kaiser Steel Corp.,** Oakland, Calif.

H. W. North, appointed chief engineer, **Dravo Corp.'s** newly- established Process Equipment Dept. of its Engineering Works Div.

Thomas W. Fauntleroy, appointed assistant general sales manager, **Pittsburgh-Des Moines Steel Co.,** Pittsburgh.

Paul McVicker, appointed manager, Metallurgical Dept., **Electro Metallurgical Co.**

W. SHERIDAN HUSS, appointed vice-president and general sales manager, Acme Products Div., Acme Steel Co.

DOUGLAS C. LYNCH, named president, Brush Electronics Co.

HOWARD C. PARKMAN, named assistant vice-president-Operations, Vanadium Corp. of America.

STANLEY G. HARRIS, appointed assistant comptroller-cost and statistics, American Steel & Wire Div., U. S. Steel Corp.

Paul A. Pitt named chief engineer, **Solar Aircraft**, San Diego; and **William C. Heath**, named executive engineer—marketing.

Henry F. Peters, becomes manager of Market Development, **Lukens Steel Co.**; and **Edward J. Verity**, was named staff economist.

Richard L. Lukey, becomes sales engineer, Refrigeration Div., North Chicago, **Houdaille-Hershey Corp.**

Niles L. Kohler, appointed plant manager, **American Chain & Cable Co.**, malleable iron foundry at York, Pa. **H. L. Cummings**, appointed assistant plant manager, American Chain Div.; and **Earl S. Lathrop**, appointed plant manager.

C. Dana McCoy, named New York manager and international director, **The Rust Engineering Co.**, Pittsburgh.

Roy C. Hobson, promoted to manager, Chicago plant, **National Malleable and Steel Castings Co.**; and **Allan S. Bixby**, made manager of the Melrose Park plant.

Bion D. Barger, Jr., and **John Kehm**, chemical engineers, have joined the process study group, **Hooker Electrochemical Co.**, Niagara Falls, N. Y.

Myron T. Bennett, appointed promotional manager, **The Diversey Corp.**, Chicago.

John Rasnick, appointed regional sales manager, **The Maytag Co.**, Newton, Ohio.

Dr. E. W. Volfmann, appointed manager, Research Dept., **Koppers Co., Inc.**, Pittsburgh.

Gerhard M. Rappich, appointed sales manager, **Borg-Warner International.**

EDWARD E. HALL, appointed technical director-tool steels, Universal-Cyclops Steel Corp.

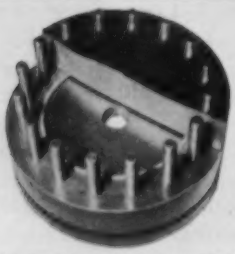
F. L. BLODGETT, appointed general sales manager, Alloy Rods Co.

ROBERT M. ZIMMERMAN, appointed general manager-Operations, Atkins Saw Div., Borg-Warner Corp.

HARRY KNUDSON, appointed manager, middle Atlantic sales region, Federal Pacific Electric Co.

DESIGN FOR HIGH PRESSURES WITH CONFIDENCE

Permanent, positive metal-to-metal static seals to theoretical limits with United Self-Energizing Metallic O-Rings.



The test fixture fracture illustrated occurred at 6500 psi pressure against a Self-Energized Metallic "O"-Ring 4½" OD, ⅛ tube size, .010" wall thickness.

UNITED *metallic O-rings*

. . . are especially adaptable for static sealing of Cylinder Heads, Hydraulic Pressures, High Octane Fuels, Air Pressures, Vacuum Connections, Vapors and Gases, Oils and Solvents, Steam Connections, Chemicals and Acids.

Made of various metals and plating finishes, United Metallic O-Rings, both Standard and Self-Energized, can be furnished from ½ in. up to any required size and configuration.

22 pages of engineering data—write for your copy today (on your company letterhead please) to Department C-7

UNITED AIRCRAFT PRODUCTS, INC.
Box 1035, Dayton 1, Ohio

AS A DIVISION OF ALLIS-CHALMERS

BUDA

HAS THE MOST
MANUFACTURING RESOURCES
IN THE LIFT TRUCK FIELD

COMPLETE INFORMATION
. . . about the NEW Buda Fork Lift Truck gives all the facts and figures, puts you in the driver's seat. Send for your free copy today!

On call and at your service . . . the vast resources of one of the largest, most progressive manufacturing companies in the world! Only the BUDA Fork Lift Truck has behind it the tremendous facilities, the engineering "know-how," the minds, men and materials of an industrial giant like Allis-Chalmers. Only Buda offers one source responsibility for lift trucks . . . only Buda can offer you *positive* assurance of the finest in lift trucks.

THE BUDA DIVISION
Allis-Chalmers Manufacturing Company
Harvey, Illinois

PERSONNEL

Leonard C. Schmidt, appointed works manager in charge of tooling and production activities, **Worcester Pressed Steel Co.,** Worcester.

John W. Bodwell, appointed manager of the work order division, **Joseph T. Ryerson & Son, Inc.,** succeeding **William G. Findlay** who has become assistant manager, Ryerson plant in Detroit.

Vernon C. Robinson, becomes a member of the Twin Cities Technical field section, Development & Research Div., **The International Nickel Co., Inc.**

Dr. Joseph Silverman, promoted to head of the Research Dept., Laboratory Div., **Walter Kidde Nuclear Laboratories, Inc.**

John H. Strome, appointed assistant manager, Chicago district sales office, **Inland Steel Co.**

Robert L. Jenkins, promoted to quality manager, Dodge Div., **Chrysler Corp.**

C. W. McIntyre, named manager, Parts & Services Dept., **Blaw-Knox Co.**

John M. Gehr, appointed assistant to works manager—Personnel Relations, Aliquippa Works, **Jones & Laughlin Steel Corp.,** Pittsburgh.

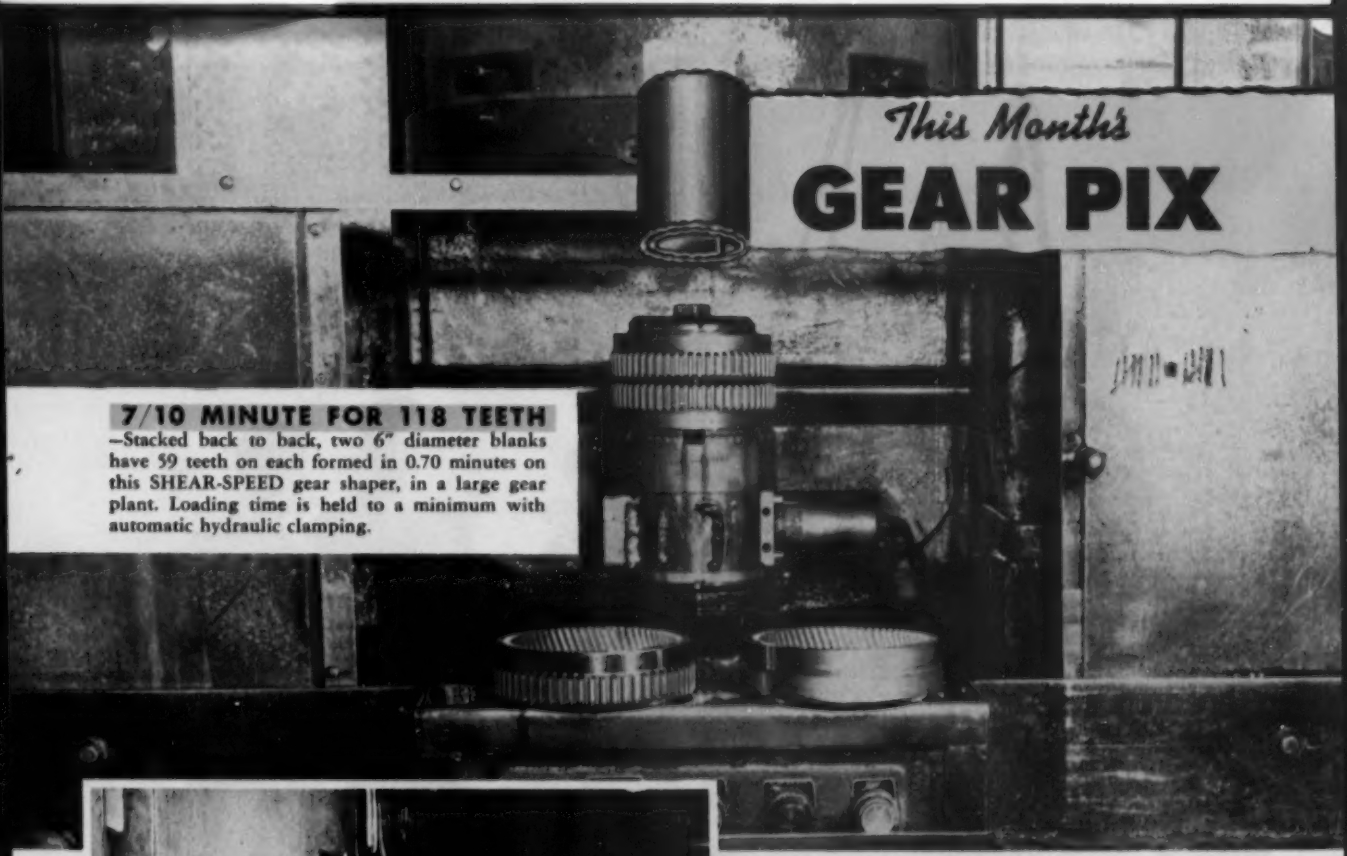
P. J. Slavish, manager has been assigned to handle the sales of hydraulic presses in Western Pennsylvania and West Va., for **Baldwin-Lima-Hamilton Corp.**

Charles W. Mote, appointed assistant plant manager, Dodge Forge Plant, **Chrysler Corp.,** Detroit.

R. H. Longwell, appointed assistant district sales manager, Seattle office, **Chain Belt Co. of Milwaukee;** and **Winston E. Teague,** appointed district sales engineer, Los Angeles District office.

This Month's

GEAR PIX



7/10 MINUTE FOR 118 TEETH—Stacked back to back, two 6" diameter blanks have 59 teeth on each formed in 0.70 minutes on this SHEAR-SPEED gear shaper, in a large gear plant. Loading time is held to a minimum with automatic hydraulic clamping.

TRUE RADIUS FILLETS—True .070" radius fillets (for maximum strength) at the base of each spur tooth are formed simultaneously on these 17-tooth gears. The 7/9 diametral pitch 1¼" face width countershaft gears are cut on two SHEAR-SPEED gear shapers manned by one operator on a truck gear production line.

12 SECONDS FOR FINISHING—Floor to floor shaving time on these overdrive pinions is 12 seconds. Operator loads the chute through the size control fixture, the rest of the cycle is automatic. Average production is 40,000 pieces between cutter sharpenings. Stock removal is 0.003-0.005" over pins.

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.

IN CANADA: COLONIAL TOOL CO., LTD.

How's this for

This one-inch section from the center slab of the steel being quenched above varied only 11 Brinell points over its entire area. Steel is AISI 4150, and the slab measures 80" long, 16" wide, and 4½" thick.

hardness uniformity

-typical of results with

Gulf Super-Quench

Charles E. Larson and Sons, a large forging company in Chicago, are enthusiastic users of Gulf Super-Quench. Recently, however, they had cause to be amazed at its ability to maintain uniform hardness and reduce rejects.

After quenching the large slab of steel shown in the photograph in Gulf Super-Quench, they cut a section one inch thick from the center and checked the hardness at the points shown in the photo. It varied only eleven points over the entire area of the section—a hard-to-believe uniformity pattern.

This is further proof of Gulf Super-Quench's ability to achieve more uniform hardness and get deeper hardening without cracking and distortion.

Have a Gulf Sales Engineer help you discover opportunities to put Gulf Super-Quench to work—profitably—in your shop. Contact your nearest Gulf office today.

THE FINEST PETROLEUM PRODUCTS FOR YOUR EVERY NEED

Gulf Oil Corporation
1822 Gulf Building

GULF

Gulf Refining Company
Pittsburgh 30, Pa.

DATA SHEET NO. 2

INLAND

facts about

LEDLOY*

*Patented Tradename of Inland Steel Company, leaders in development of Leaded Steels.

METAL SHOW VISITORS SEE LEDLOY MACHINED AT 300 SFM

37% faster than the best of other steels!

Hour after hour, a Brown & Sharp automatic screw machine, at the recent A.S.M. National Metal Show, turned out a special screw machine part to demonstrate the superior machinability of Ledloy Steels. The screw machine was set up by Joseph T. Ryerson & Son, Inc., national distributors of Ledloy, to form, drill, tap, thread O.D., knurl and cut off this part.

Ledloy machined this part in 24 seconds.

Throughout the five days of the show, Inland Ledloy Grade A was run at 300 S.F.M. Machining time was 24 seconds per part!

The fastest speed attainable, with comparable tool life, machining this same part from the best of other screw machine stocks was 225 S.F.M., resulting in a machining time of 33 seconds per part.

Ledloy consistently out-performed the best of conventional screw machine steels with an average increased production of 37%!

Ledloy Gives Longer Tool Life

The ability of Ledloy steels to give you more production from your present machinery is only one of their advantages. Ledloy also means longer life for your tools because Inland's patented process of adding lead to steel lowers the steel's friction component. Ledloy actually lubricates the cutting tool during machining, reducing the heat generated and minimizing tool wear. And, because of the lead, Ledloy chips break up into shorter lengths which quickly fall clear of the tool, again reducing friction.

All this means less tool wear and tool edge build-up, longer periods between tool grinds and longer life for your tools.

Although the lead in Ledloy makes it the easiest machining steel you can buy, it does not alter the very desirable qualities inherent in open hearth steel. You can expect from Ledloy the same performance in ductility, strength and heat treating properties that you get with good open hearth steel of comparable chemistry. This means that, using Ledloy, manufacturers of screw machine products and producers of machined forgings can get more product per man-hour, superior machining and finishes without sacrificing all the desirable mechanical and metallurgical properties of open hearth steel.

Ryerson demonstrates Ledloy's superiority at Metal Show.

If your product requires machining, it will pay you to get all the facts on Inland Ledloy. Ask your cold drawn bar supplier about it today, or write Inland Steel Company for an interesting new booklet, "Properties of Inland Ledloy Steels."

world's most machinable steel!

LEDLOY

INLAND

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Louis • Davenport • Kansas City • St. Louis • Indianapolis • Detroit • New York

The Iron Age
FOUNDED 1855
TECHNICAL ARTICLES

Joints Brazed With New Nickel-Base Alloys Exhibit Good Properties

◆ Good mechanical properties and resistance to corrosion and oxidation are among the chief features of a new series of high-nickel brazing alloys . . . By alloying with the base material, they form a bond of exceptionally high strength.

◆ Most metals having melting points above 1850° can be brazed successfully with the new alloys . . . Some materials previously difficult to braze can now be joined easily and satisfactorily . . . The alloys are made in rod, powder, wire, strip and washer forms.

By C. V. FOERSTER, Research Director, Coast Metals, Inc., Little Ferry, N. J. and R. C. KOPITUK, Metallurgist, Reaction Motors, Inc., Rockaway, N. J.

◆ A NEED HAS EXISTED for brazing and coating materials which have good mechanical properties and high resistance to oxidation, wear and corrosion at both low and high operating temperatures. To fill this gap, Coast Metals, Inc., Little Ferry, N. J., has developed a new series of nickel-base alloys overcome some limitations of earlier high-temperature brazing and coating materials.

Versatility of these alloys allows the use of modern continuous furnaces with exothermic gas generating equipment. These alloys also make it possible to join sections where sizes were previously considered impractical; to braze assemblies in large quantities; and to convert costly batch-type operations to more efficient and economical continuous production techniques.

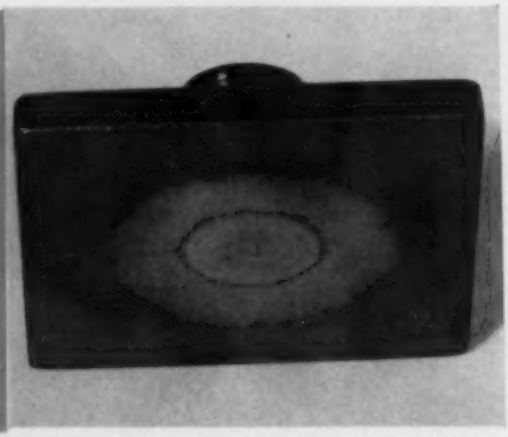
Joints made with these alloys differ metallurgically from those made with copper,

Nickel-Base Brazing Alloys

Alloy	Nominal Composition	Flow Point, °F.*	Hardness, Rc, Before Brazing	Recommended For
50	93.25 Ni, 3.50 Si, 2.25 B, 1.00 others	1925	39 to 44	Wide or close clearance joints, good pre-diffused strength, thin-walled sections.
52	91.25 Ni, 4.50 Si, 3.25 B, 1.00 others	1825	57 to 62	Good general brazing conditions. Must be held at temperature for high strength joints.
53	82.10 Ni, 4.50 Si, 2.90 B, 7.00 Cr, 3.00 Fe, 0.50 others	1825	57 to 62	Good general brazing conditions. Best alloy for use in air atmosphere.
56	71.25 Ni, 4.00 Si, 3.75 B, 16.00 Cr, 4.00 Fe, 1.00 others	1880	57 to 62	Material conforms to AMS-4775.

* In Dry Hydrogen.

UNIFORMITY of fillets from entry side of rocket component illustrates the flowability obtainable with the new nickel-base alloys.



EXIT SIDE of assembly brazed with a nickel-base brazing alloy shows complete penetration achieved through high fluidity of alloy.

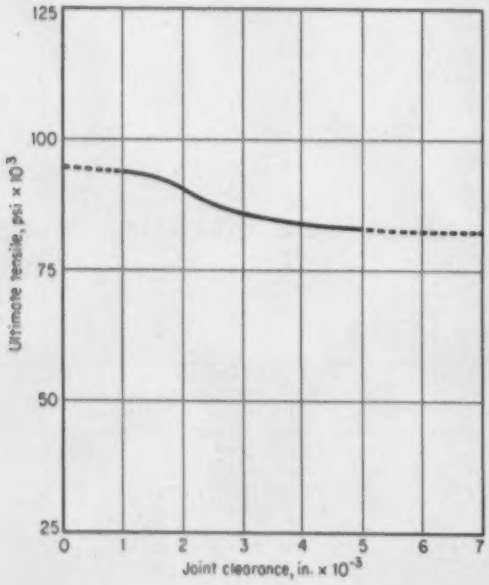
brasses, bronzes, solders and other popular joining materials. They approach closely in mechanical properties, corrosion resistance and oxidation resistance the stainless and heat-resistant alloys for which they are largely intended.

Some of these alloys possess great fluidity, while others are comparatively sluggish. Variations in flow characteristics are necessary to meet different brazing and service conditions.

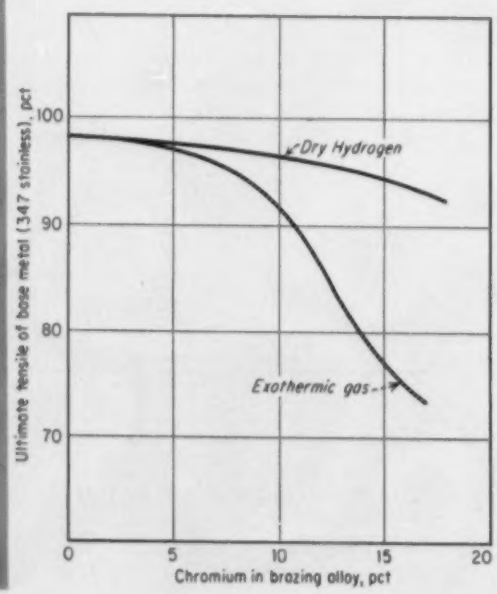
While the chemical composition of two of the alloys, Nos. 50 and 52, is very similar, considerable difference exists in their physical characteristics before brazing. These alloys are intended to produce similar end results in joints brazed under different conditions.

During brazing and alloying, hardness of the brazing materials drops and a corresponding increase in melting point and ductility occurs. Holding the assembly at brazing temperature will produce an essentially homogeneous, uniform structure without disturbing the initial

Brazed Joint Strength vs. Clearance in Type 347 Stainless



Effect of Chromium on Joint Strength



joint. Once a joint is brazed, the alloying and consequent increase in melting point which has occurred will necessitate heating the assembly above the original brazing temperature and close to the melting temperature of the joined parts before they can be separated.

Most metals with melting temperatures above 1850°F can be brazed successfully with one of the new alloys. Brazing techniques are modified when such metals form refractory oxides.

Use of these alloys for austenitic types of stainless (particularly 321 and 347), Nichrome, Inconel and other high-nickel alloys offers few problems. Precipitation-hardening alloys, such as Armco 17-7PH, which were considered difficult to braze, are now joined with relative ease if special heat treatments are observed.

Heat-treatable steels soften at brazing temperature and present individual problems in rehardening. However, in some instances, brazing and hardening can be done in a single furnace cycle.

Use standard joint design

The new high-nickel brazing alloys will generally perform satisfactorily for joint designs which are normally used for conventional brazing alloys. The best joint design is one which permits movement of the brazing alloy without interference from the surfaces of the parts or accumulated gases.

Another point to consider is the desired degree of alloying with the parent metal. Both the degree and the effect of alloying will vary, depending on the geometry of the joint and the chemical properties of the parts to be joined.

One important factor in alloying is the depth or amount which is determined by the quantity of alloy used, the brazing temperature and the time at temperature. Temperatures well above the liquids accelerate alloying appreciably. Also, alloying continues while the assembly is at brazing temperature.

Good cleaning a "must"

In brazing thin sections, a minimum of alloying is usually desired because excessive alloying will affect the properties of the parent materials. Another point to consider is that the distance the alloy will flow is governed to a great extent by the rate of alloying.

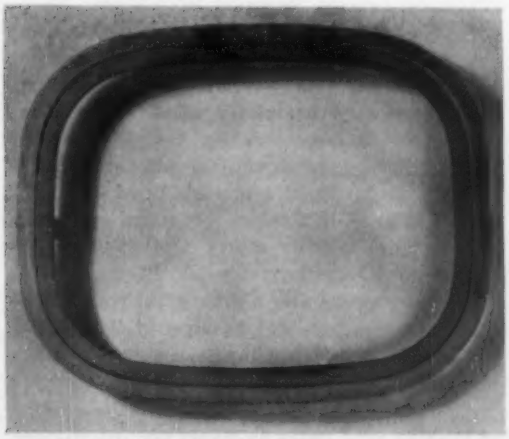
Positioning of the alloy is also important. The brazing alloy must be placed as near to the joint as possible in heavy sections where heating may be irregular, or where heating rates are slow, as in batch-type furnaces. If the alloy reaches its flow point before the joint attains the proper temperature, an incomplete braze will result.

Only clean surfaces will braze satisfactorily. Any foreign matter may interfere with the flow of the alloy. While most cleaning methods are acceptable, sand blasting is not recommended because silica interferes with alloy flow. Grit blasting is satisfactory when clean grit is used. Cleaning the joint surfaces with a solvent before assembling should follow any abrasive cleaning. Solvents should be of an oil-free type, such as ether, acetone or carbon tetrachloride. After cleaning, handling of surfaces with bare hands should be avoided.

Assembling and brazing the parts immediately after cleaning is the ideal procedure. If delay is necessary between cleaning and brazing, the parts should be kept in air-tight containers, or wrappers. Tightly-closed metal containers, cellophane or vinyl plastic bags are very effective. Waterproof paper, if used, should be free of oil, wax or other contaminants.

Parts may be joined effectively by first spraying them with a brazing alloy, providing they are brazed immediately after spraying, or protected during storage. Sprayed parts should be held for not more than 48 hours before brazing.

These alloys are self-fluxing when used in atmospheres of dry hydrogen, argon or helium. With dry hydrogen, a dewpoint of −60°F or lower is required. In other atmospheres, it is sometimes necessary to add a small amount of flux to protect the brazing power and parent metal surfaces. Potassium pentaborate is satisfactory, but its quantity should be limited to a maximum of 15 pct by weight of the brazing alloy. Prepared mixtures of wet flux and brazing alloy may be used if mixed in this same



TV RING ASSEMBLY of copper brazed to stainless is another application for the new alloys. They offer good resistance to corrosion.

proportion. High temperature fluxes containing fluorine should be avoided because the new alloys do not flow readily in their presence.

Use of flux is recommended, when brazing in a hydrogen atmosphere formed from cracked ammonia, to avoid formation of nitrides on the joint surfaces which would prevent proper wetting. Surfaces coated with an alloy by spraying can be brazed in any atmosphere without the use of flux.

As supplied, these alloys are hard and nonforgeable. They are made in the form of cast rod, powder, wire, strip and washers. The last three forms are made of alloy powders mixed with an organic binder. The powders, for which patents have been applied, can be mixed with acryloid resin thinned with carbon tetrachloride. This mixture produces satisfactory results in a dry hydrogen atmosphere. The powders can also be mixed with a special oil. A paste made in this way can be stored for an extended period of time and will perform satisfactorily in certain applications.

In rod or powder form, these alloys can be used with virtually every brazing process. Where a large amount of alloy is required, it can be applied best in rod form with an oxyacetylene torch, using a neutral or slightly reducing flame.

In powder form, the alloys can be applied efficiently with any of the proprietary torches used for metallizing. Such torches are particularly suitable where close control of heat and thickness of deposit are necessary, and in places inaccessible for manual application with torch and rod.

Salt baths may work

Satisfactory coatings can also be applied with the alloy in rod form, using a hand welding torch with a nonconsuming electrode in an inert atmosphere shield.

Any standard furnace equipment capable of producing temperatures up to 2150°F can braze these alloys satisfactorily. While brazing is generally done at lower temperatures, additional heat may be required in some cases.

Induction heating requires maximum contact between the parent metal and the brazing alloy to assure proper heat transfer. This is acquired through proper joint design and positioning of the assembly during brazing. Preliminary research shows that salt baths may be used successfully.

With all brazing alloys, joint clearance should be the minimum which will permit free flow of the alloy. High fluidity of the new alloys, when used on thin sections with rapid heating, gives them flow characteristics equivalent to those of copper. They can be used successfully on press fits and joints having clearances less than 0.001 in.

In powder form, the best flow of the new alloys is obtained when the powder particle size is the coarsest compatible with the joint design. Coarser grains offer less exposure for a given volume of alloy, better flowability.

Flow characteristics are affected significantly by the self-fluxing qualities of these alloys. Boron and silicon react with oxidizing gases even at low partial pressures. However, the presence of chromium in alloys No. 53 and No. 56 retards the rate of oxidation.

Exothermic gas is slightly oxidizing to chromium steels. Therefore, the chromium-free alloys, which are actively self-fluxing, will produce the heat results when brazing stainless or heat-resistant alloys in this atmosphere. For carbon and low-alloy steels, the exothermic atmosphere has an opposite effect, and the No. 53 alloy, containing 7.0 pct chromium, brazes well.

Base metal strength approached

Maximum joint strength is only secured with joints which are sound throughout. Joint defects such as flux inclusions, voids, cracks and insufficient alloying will reduce joint strength. Other factors which contribute to the soundness of joints are: selection of the proper alloy, proper joint clearances, placement of the brazing alloy, use of nonoxidizing atmosphere or a maximum of 15 pct flux, and the selection of a proper time-temperature cycle.

Cracks can be caused by movement of the pieces while the brazing material is still in a semi-fluid state. Proper support of parts to be joined helps to alleviate this possibility. Use of the lower brazing temperature range permits the braze area to solidify before contraction begins. If a maximum time-temperature cycle can be used without movement of the pieces, sound, fully-alloyed joints are obtained.

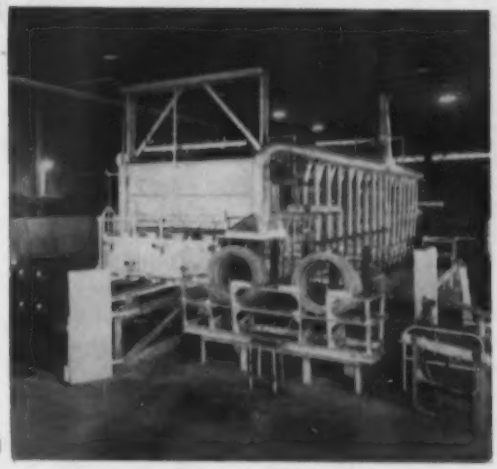
Strength of joints in type 347 stainless is not much less than that of the base metal when the brazing alloy contains 7 pct chromium or less. However, joint strength drops sharply as chromium content increases beyond that figure.

High chromium content in the brazing alloy can also contribute to the formation of voids in the brazed joint, even when all other approved practices are observed. Inspection figures show that consistently better joints are made with the chromium-free alloys, and only slightly lower results are obtained with the No. 53 alloy. Joint design practices used with conventional brazing alloys also apply to the new high-nickel alloys.

The new nickel alloys inherently resist many types of corrosion, and because of their alloying action, tend to develop corrosion resistance comparable to that of the parent metal.

Applications for these alloys include coating or brazing such parts as steam and other types of valves requiring corrosion resistance, high-temperature jet and rocket parts, roller parts, honeycomb materials and others.

Two basic cycles—



CHARGE end of furnace shows coils in vertical position against trays as placed by fork lift truck. Furnace control panel is left foreground and charge table control panel at right.

Restore Surface Carbon In Sub-Critical and Over-Critical Anneal

◆ Coils of cold forming and automatic machining stock are produced without surface decarburization in a controlled atmosphere, continuous annealing furnace . . . Only two basic furnace cycles are needed.

◆ One cycle is a sub-critical anneal and produces a structure ideal for most cold forming operations . . . The other is an over-critical anneal producing a structure suitable for automatic machining work.

By J. D. Armour, Chief Metallurgist,
Union Drawn Steel Div., Republic Steel Corp., Massilon, O.

◆ SCALE FORMATION and surface decarburization are problems often encountered in the production of cold drawn wire, rod or bar stock when high temperature annealing operations are required.

To overcome these difficulties a continuous pusher, tray-type, controlled atmosphere furnace is used at Republic Steel's Union Drawn Steel Div. for continuous large scale annealing of cold drawn rod and wire in coils.

With this installation rigid customer specifications are met with uniform microstructures. And stock with completely restored surface carbon is made available for exacting requirements.

Standby facilities insure maximum production from the furnace and protection against the hazards entailed with a combustible atmosphere operating below 1400°F.

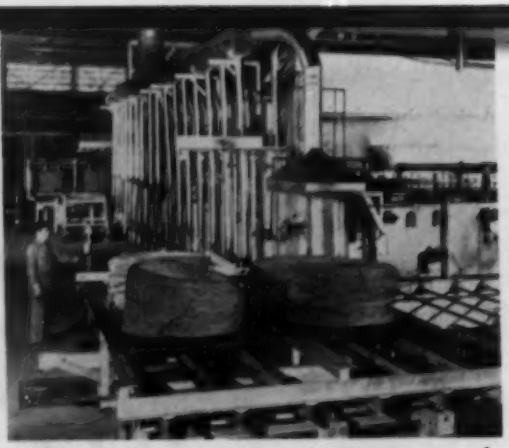
The furnace, built by Surface Combustion Corp., Toledo, is about 86 ft long with atmosphere vestibules at each end. The inside width is 10 ft which permits two rows of coils to be pushed through the furnace on trays, two at a time. Each tray holds up to 1500 lb of work. With 13 trays in each row, the entire furnace can hold nearly 40,000 lb. About 1000 tons of coils, ranging from ⅛ to ¾ in. round are annealed each month.

Since about 90 pct of all production from the coil furnace is for either cold forming or automatic machining operations, only two basic furnace cycles are required as most of the steels annealed are within the 0.35 to 0.50 pct carbon range.

Cycle I is a sub-critical anneal and produces a structure ideal for most cold forming operations. Cycle II is an over-critical anneal that produces a structure ideal for use in automatic machine operations. Both of these cycles, shown in Table I, produce stock that is carbon corrected on the surface.

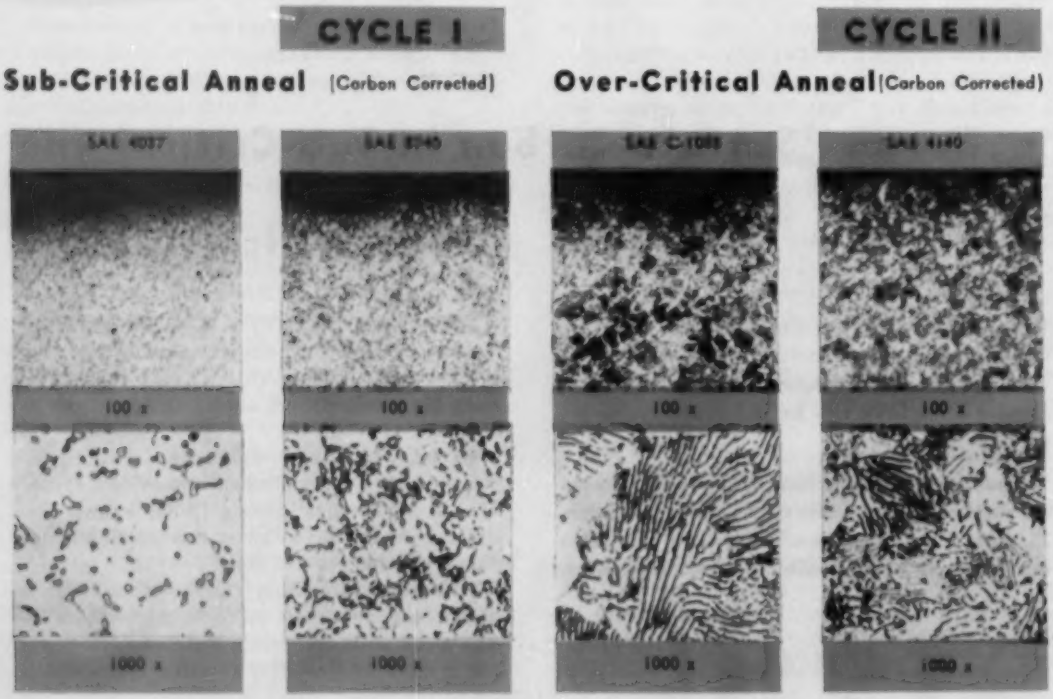
The controlled atmosphere used in the heating chamber and both vestibules is produced by an RX* gas generator. A typical analysis of this gas would be CO_2 – 1.4 pct, CO – 18.7 pct CH_4 – 0.5 pct, H_2 – 34.5 pct and the remainder nitrogen. With the generator gas dewpoint held between +65 to 80F, the carbon potential of the atmosphere is in good balance with the 0.35 to 0.50 pct carbon steels at the temperatures being used. These steel grades include AISI 4000, 4100, 5100, 8100 and 8700.

Up to 3600 cfh of RX generator gas is required for full production. For operations requiring a higher carbon potential, enriching natural gas can be added. To check the dewpoints, a six-station Surface Combustion automatic dewpoint recorder is used. Dewpoints of all zones and the generator are recorded consecutively and automatically as follows: Station 1—RX gas generator; Stations 2 to 6—first five



DISCHARGE end of furnace with four trays ready for unloading. Discharge car has been moved back into furnace and trays pushed forward.

PHOTOMICROGRAPHS of different steel grades using two basic annealing cycles. (100 and 1000X) Note uniformity of carbon throughout section.



zones of the furnace. Gas tests are made once a week at the generator and intermittently in the furnace.

For maximum flexibility, the heating chamber is divided into six zones of individually controlled temperature. Each zone is equipped with a recirculating fan to provide temperature uniformity and complete exposure of the stock to the carburizing atmosphere. The closeness of control required is reflected in the range of typical specifications shown in Table II which are representative of customer requirements. To check production from the furnace, samples are taken from every "push" of two trays and hardness and microstructure determinations made.

These hardness figures, after annealing, are actually lower than those of the final product. This is due to the fact that after annealing, the stock is pickled, limed and mechanically cold drawn to desired size. The amount of reduction in this latter operation will vary according to end product requirements.

Operating cycle is automatic

The furnace is charged by a fork lift truck equipped with special coil carrying prongs. The coils are positioned vertically in a special loading rack containing the trays which have also been tipped on end. The coils are placed against the trays and the entire rack tipped back to bring the tray-coil load into proper position. They are then pulled forward by retractable "fingers" onto the charge car ready for the automatic furnace cycle which is started by the furnace operator.

The cycle of operation is completely automatic after the charge car, carrying two 56 in. x 56 in. trays of coils, moves into the charge vestibule. The vestibule is then purged of all air by atmosphere gas.

In the next step of the cycle, the inner door of the discharge vestibule opens and two trays are pulled on the car in this chamber. The inner door closes. The discharge car moves out of the vestibule, coils are unloaded by pusher mechanism, and the car returns into the vestibule.

At this moment, the inner door of the fully purged charge vestibule opens, two loaded trays on the charge car are pushed into the furnace and the inner door closes again. This purging is also carried out at discharge end before vestibule is opened to atmosphere-filled furnace heating chamber.

Unloading of coils at the discharge end is accomplished by fork lift truck using a reverse of the tray-coil handling procedure employed at the charge end. Time in the furnace from charge vestibule to discharge vestibule can be varied to suit the annealing cycle but the shortest push interval is every ¾ hr.

Suction-type, gas-fired, radiant tube heating elements are used throughout the heating chamber. They are located above and below the work. A slight positive pressure of atmosphere gas is maintained in the heating chamber and a slight negative pressure is maintained inside each radiant tube. This prevents the contact of detrimental products of combustion or room air on the work in case of heating tube failure.

TABLE I

Basic Annealing Cycles with Carbon Correction

	Zone 1	2	3	4	5	6
CYCLE I (Sub-Critical Anneal)	1400F	1420F	1275F	1275F	1275F	1100F
CYCLE II (Over-Critical Anneal)	1500F	1500F	1500F	1260F	1200F	1200F

Steel grades include: AISI 4000, 4100, 5100, 8100, 8700 with carbon contents ranging from 0.35 to 0.50. These constitute 90 pct of production.

TABLE II

Typical Hardness Specifications After Annealing

CYCLE I (Sub-Critical Anneal)		CYCLE II (Over-Critical Anneal)	
Steel (AISI)	Maximum-Hardness, Bhn	Steel (AISI)	Maximum-Hardness, Bhn
4042	160	4037	151
4140	170	4140	174
5140	166	8127	148
8740	170	8740	174
8735	156	8735	160

Cycle I production must show spheroidized structure. Cycle II production must show lamellar pearlite structure.

Using natural gas as fuel on the furnace and generator, an average six months fuel cost would be about $2.75 per ton of steel processed by the furnace. This figure includes fuel cost during heating up or during nonproductive hours with furnace at temperature.

To insure continuous uninterrupted production, maximum safety for the personnel and equipment and to minimize stock loss or damage, standby power and inert purge gas supplies are provided for this equipment.

A gas engine generator set provides power to all furnace equipment automatically in case of power interruption. It is standard practice to start up this unit as soon as conditions develop that might interrupt power.

An inert gas storage system supplies purge gas for the furnace heating chamber and vestibules. Inert (high nitrogen) atmosphere from an NX* gas generator is stored in a tank under pressure. The purpose is to automatically provide an emergency supply of inert NX gas for purging the furnace in the event of failure of the carrier gas generator units.

* Trademark, Surface Combustion Corp.

Absorb impact—

Proper Mount Design, Selection Aid Vibration Control

By E. A. JOHNSON,
Vice-President,
The Barry Corp.,
Watertown, Mass.

VIBRATION impact from heavy machinery is considerably less when vibration mounts are used.

◆ Vibration control is not achieved merely by slipping some kind of pad under the legs of machines . . . First it must be determined whether the problem is one of shock or vibration or a combination of the two.

◆ Mounts for isolating vibrations are different from those intended to absorb shock . . . The difference is mainly one of resilience . . . Springs, glass, silicone, rubber and cork can be used as mount materials . . . More important is proper mount design.

◆ HIGH reject rates, downtime and excessive maintenance costs can many times be traced to the direct or indirect effects of vibration.

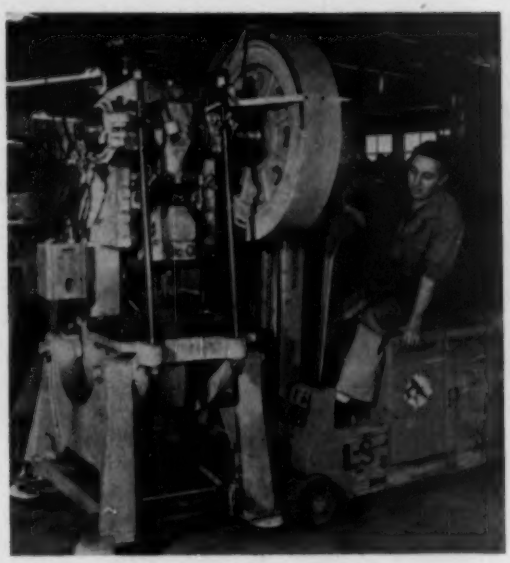
Excessive vibration and noise in metal-working plants generally stem from two types of equipment: impact machines such as punch presses, cold heading and riveting machines; and machines with a rotating component like grinders, lathes, milling and boring machines.

In impact machines, a great deal of shock may be transmitted to the structure of the building and thence into neighboring equipment where precision operations may be affected. And noise is an inescapable by-product. It is generated both in the immediate area of the impact and radiated from vibrations set up in belt shields, machine covers, ductwork and a variety of other objects.

In the second type of machine, the same general effects flow from an imbalance in the rotating mass.

Vibration control is not achieved merely by jacking up machines and slipping some kind of pad under the legs. Many plants regard the problem as sufficiently complex to warrant placing it in the hands of consulting engineers who specialize in vibration and noise control.

The engineer seeks first to establish whether the problem is one of shock or vibration, or both. For, while the two are intrinsically the same, the frequencies and the intensity of the forces involved are dissimilar.



SELF-LEVELING Barry mounts permit greater mobility in relocating machine tools and presses.

LEVELING operation is fairly simple. Worker adjusts bolts, while the other tests level.

Mounts designed to isolate vibration will be different in character from mounts intended to absorb shock. This difference is primarily one of resilience. The softer a mount, the lower will be its natural frequency and the greater its ability to isolate vibration. Conversely the stiffer the mount, the higher will be its natural frequency. Stiff mounts are better suited to shock absorption.

While a mount intended to isolate vibration should be as soft as possible (a mount will begin to isolate at frequency approximately 1½ times the natural frequency of the mount. Isolation improves as the difference between the mount's natural frequency and the machine vibration gets greater), too soft a system may cause the machine to float excessively and thus raise the problem of stability. In such cases it is necessary to compromise between the two.

To isolate shock the amount should be stiff enough to have a natural frequency higher than that of the machine. Its function is to absorb the tremendous amount of energy released at the moment of impact and dissipate it over a longer period of time. This, in effect, greatly reduces the peak forces which otherwise would be transmitted to the floor.

It is also necessary to know the characteristics of the mount when it is loaded with the weight of the machine. Stability—the degree of motion permissible in a given installation—may also limit the kind of material or determine the type of mount.

Damping is another factor which may enter into the choice of a mount. While there is some difference in damping properties between such materials as rubber and fabric compounds, this difference is not especially significant. Where a high degree of damping is required, the needed friction is best introduced into the system by built-in mechanical devices.

Any resilient substance will isolate vibration and shock. Thus, springs, glass, silicone, rubber, cork and various fabric compounds have all been used for the purpose. Neoprene is as good as any, and offers in addition good resistance to oil, caustic cleaning fluids and cutting oils.

More important than the kind of material is proper design of the mount in terms of the forces to be isolated and the physical characteristics of the machine it is to support.

Mounts absorb impact

When a new plant or an extension of facilities is still in the planning stage, there is an opportunity to effect substantial savings in building costs by designing for vibration control. For example, it is the practice to lag punch presses, milling machines and many other machine tools to floors to prevent them from "walking." Again, special concrete foundations are generally poured to accomodate heavy equipment, primarily to support dynamic loading.

Except for very heavy machines, effective vibration control may eliminate both of these costly steps. A properly mounted machine does not walk; it floats on the mounts. It does not require massive foundations to withstand shock and vibration. The mounts absorb so much of the impact that dynamic load does not greatly exceed deadweight load.

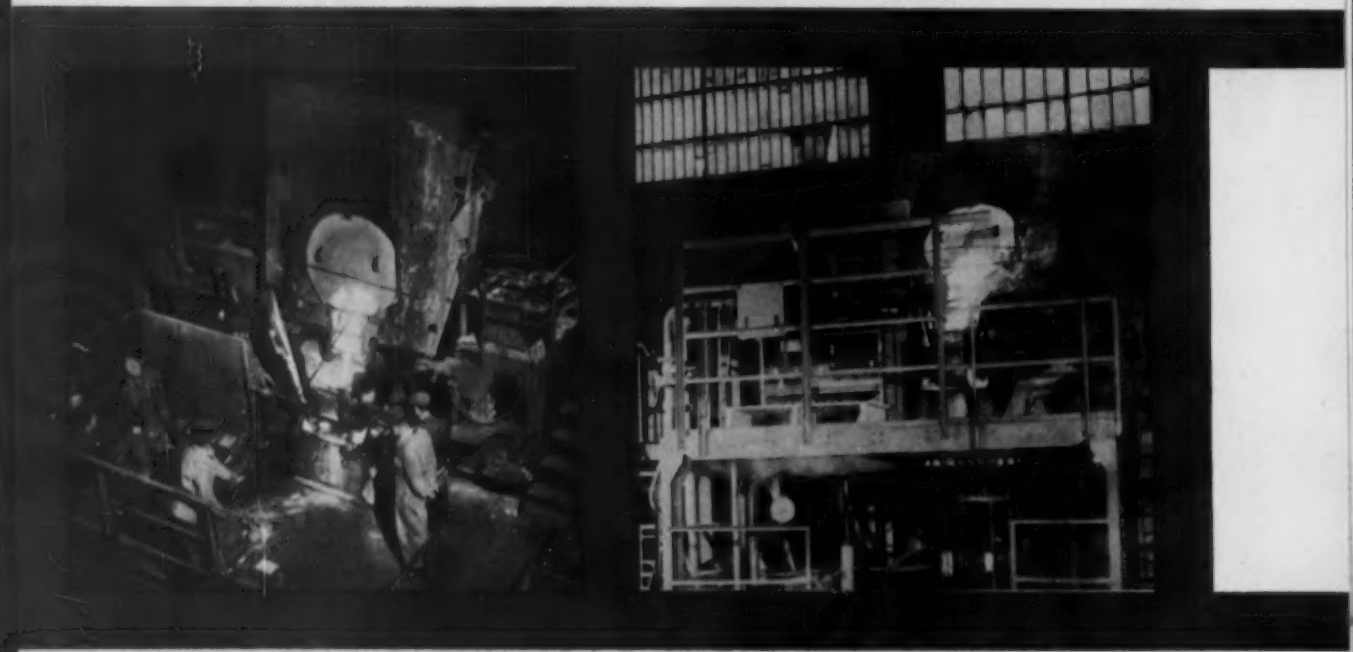
In existing plants a critical analysis of operations will usually prove to be enlightening and potentially profitable. The causes of reject should be examined, the individual items in maintenance expense noted.

Continuously Cast Wide Range of Alloy Steels

By J. SELRON, Chief Engineer,
Jacob Holtzer Works,
Compagnie des Ateliers et Forges de la Loire,
Unieux, France

◆ Stainless, heat resisting, electrical and tool steels have all been successfully continuous cast in France . . . While production is limited to about 25 metric tons per day, the steels show mechanical properties which compare favorably with the ingot cast steels.

◆ An oval cross-section is used to obtain optimum internal soundness . . . Segregations are more dispersed along the long axis of the oval billet . . . Casting temperature is generally kept from 140°F to 180°F above the liquidus.



Left: CONTINUOUS casting two 13 pct Cr stainless steel billets of oval section at the Unieux Works.

Right: FURNACE FEEDS metal into holding ladle above. Two downcoming billets are cooled below.

◆ HIGHLY ALLOYED STEELS, including stainless, heat resisting, electrical and tool steel grades, are being continuously cast on a limited production basis in France. Oval shaped billets, with high internal soundness, are produced at a rate of 25 metric tons per day at the Jacob Holtzer Works of Compagnie des Ateliers et Forges de la Loire, Unieux, France.

Steel is melted or poured from a steel mill furnace into a 1.5 metric ton high-frequency induction furnace. From here it periodically goes into a holding ladle or tundish which controls the flow of metal into the mold. The tundish is equipped with one or two bottom spouts from 0.393 to 0.590 in. ID and stopper valves. It is possible to cast either two oval sections 2.036 x 3.149 in. simultaneously or one oval section 3.149 x 4.133 in. alone. The 27 in. long water cooled mold is a copper tube from 0.157 to 0.196 in. thick. The mold cavity is hard chromium plated with a few hundredths of an inch of electrolytically deposited chromium. Water is pumped through the gap between the mold and an external steel sleeve.

Cooling rate important

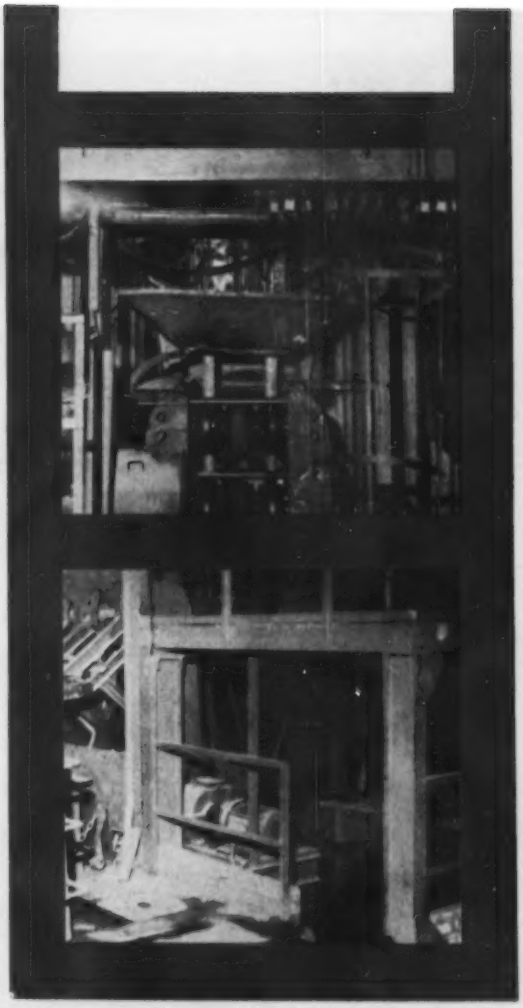
Experience has shown the oval billet gives optimum internal soundness, although the equipment required is more difficult to produce. The improvement in quality which the oval cross-section gives the billets is considerable. Segregations are more dispersed along the long axis of the oval billet. In contrast, segregations are concentrated along the longitudinal axis of round or square bars, decreasing their transversal properties.

Rate of cooling of the down flowing metal in the mold is of major importance. Best results are obtained at a maximum cooling rate. This can be achieved by a fast turbulent water flow along the copper mold interface to accelerate heat transfer. At Unieux, water flow rates are kept at 6 to 7 U. S. gal per pound of metal cast.

At the mold exit the billet receives additional cooling in the form of water sprays similar to other installations. Controllable atomized water sprays are called for when abnormal casting conditions are present, that is to say when the billet leaves the mold with a liquid core. Water spray cooling increases grain fineness but cannot be applied to some high speed steels and air-hardening steels for which steep temperature gradients are inadequate.

Additional cooling is applied to the billet along a length of about 31 in. within a metallic sleeve right under the mold. Underneath this sleeve are two sets of variable speed motor driven withdrawing rolls. Easy speed control is achieved according to a gaged speedometer with vertical speed graduations.

The casting speed which controls the process of cooling is an important variable. For a given casting temperature and cooling rate, it directly affects heat transfer from the billet to the mold, as well as the internal soundness of the section.



Top: **CLOSEUP of cooling system and withdrawing sets as two billets pass between withdrawing rolls.** Bottom: **UPPER PART of elevator mechanism, shown at extreme left, lifts cut billets to mill floor.**

In the case of special steels, a flattened solidification line cannot be obtained unless the casting rate is slow. The casting speed is kept at from 23 to 35 ipm for billets 2.036 x 3.149 in. Casting temperature should be maintained as closely as possible within ± 10°F and above the liquidus of the cast metal. The casting temperature is generally kept at from 140°F to 180°F above the liquidus to allow for cooling through the tundish and to have a security margin in case of technical trouble.

As it leaves the furnace, the casting temperature of the steel is kept at from 180°F to 216°F above the liquidus of the metal. Biggest difficulty is to keep these temperatures constant during each casting operation which may last from 30 to 45 minutes depending upon the kind of mold used. Fortunately, the bath temperature in high-frequency induction furnaces can be controlled within very close limits by varying the feed of

Properties of Continuous and Ingot Cast High Alloy Steels

Structural Steels

NICKEL-CHROMIUM-MOLYBDENUM*

	Tensile Strength, psi	Elongation, Pct	Impact Strength, ft-lb
Continuous cast	298,760	9	11.6
Ingot cast	291,600	8.7	10.4

* French standard specification 40 NDC 19. Metal hot worked at a rate of 2.8 pct, air hardened and reheated at 392°F.

NICKEL-CHROMIUM*

	Longitudinal Impact Strength, $I.S._l$	Transverse Impact Strength, $I.S._t$	Quality Index $I.S._l + 2\,I.S._t$
Continuous cast	20	17.4	54.8
Ingot cast	19.6	16.9	53.4

* French standard specification 30 NC 11. Metal hot worked at a rate of 6.2 pct, oil-hardened and reheated to Bhn 302.

NICKEL-CHROMIUM-MOLYBDENUM*

	Longitudinal Impact Strength $I.S._l$ ft-lb	Transverse Impact Strength, $I.S._t$ ft-lb	Quality Index $I.S._l + 2\,I.S._t$
Continuous	18.7	15.4	48.5
Ingot cast	17.6	13	43.6

* French standard specification 20 NCD 18. Metal hot worked at a rate of 6 pct, heat-treated to about Bhn 302.

Magnetic Steels

MAGNETIC SUSCEPTIBILITY

	CONTINUOUS CAST		INGOT CAST	
Steel Grade	Flux Density *	Flux Density **	Flux Density *	Flux Density **
6 pct – 2 pct Co	74.5	96	73.5	95.5
15 pct Co	66.5	96	66	96.5
35 pct Co	66.5	93.5	99	94

* Measured in open magnetic circuit.
** Measured in closed magnetic circuit.

High Speed Steels

Life curves of two grades of high speed steel tools against speed are practically identical for continuously cast and ingot cast steels. These steels were made according to French standard specifications Z 75 W 14 (14 pct W steel) and Z 80 W 18 (18-4-2 steel).

electrical energy to the furnace. Liquid steel temperatures are recorded with immersion pyrometers during the casting operation and can be corrected immediately. Experience at Unieux in making good quality acid crucible steels has contributed to making the continuous casting process a smooth operation.

The continuous billet is cut into sections by a 150-metric-ton hydraulic shear. The cut billet falls into a receiver on the lowest floor of the plant from which it is lifted to the steel mill floor by a mechanical automatic elevator.

Maximum daily output of the casting unit is 25 metric tons or 1 metric ton per hour with a 6-man crew.

Major advantage of the plant is the possibility of casting continuously any standard grade of special steel, and obtaining a billet at least as sound as an ingot.

While the hourly output of 1 metric ton is small compared to foreign achievements, this production is exclusively of special steels in the following classes: (1) Cr, Cr-Mo, Cr-Mo-V and Cr-W-V tool steels. (2) Cr and Cr-Ni type 18-8 stainless steels with or without Mo additions. (3) High Cr and Ni heat-resisting steels. (4) Standard 10-13 pct W high speed steels and top quality 18-4-1 steels. (5) Cr-Co magnetic steels with high Co content. (6) Dimension stabilized 14 pct Cr steels. Such special steels, considering their production costs may be advantageously continuously cast even in small batches if a good quality product can be invariably obtained in routine production.

The data shown in the accompanying table, taken at random from control reports show some of the outstanding results obtained. They concern several kinds of special steels and are average values of properties of samples from several tons of heats. The metals fall in three groups, structurals, magnetic and high speed steels.

Studies on several heats of 18-8 type steels in the form of bars and Ni-Cr steels for automotive exhaust valves in the form of stubs from 0.354 to 0.393 in. diameter, have shown a 25 to 30 pct increase in metal yield for continuously cast billets (77 to 83 pct against 55 to 58 pct).

One year of industrial practice in continuous casting at Unieux has shown the process to be economically suitable for the production of special steels at the Jacob Holtzer Works. The continuous casting technique, while it can be improved, may take a leading place in the processing of highly alloyed steels.

Big Extrusion Press Completed for Air Force Program

◆ THE AIR FORCE'S heavy press program was given a boost recently with the completion of an 8000-ton hydraulic extrusion press.

The press is one of two designed and engineered by Loewy-Hydropress, Inc., and built by Nordberg Mfg. Co. for installation at Kaiser Aluminum & Chemical Corp.'s Halethorpe, Md., plant. A third of similar design is slated for shipment to the Harvey Machine Co., Torrance, Calif.

The huge press is almost 174 ft long with hydraulic equipment, controlling mechanism and run out tables. It weighs about 4 million lb. Shipment from Nordberg's Milwaukee plant to the installation site requires the service of 50 heavy freight cars.

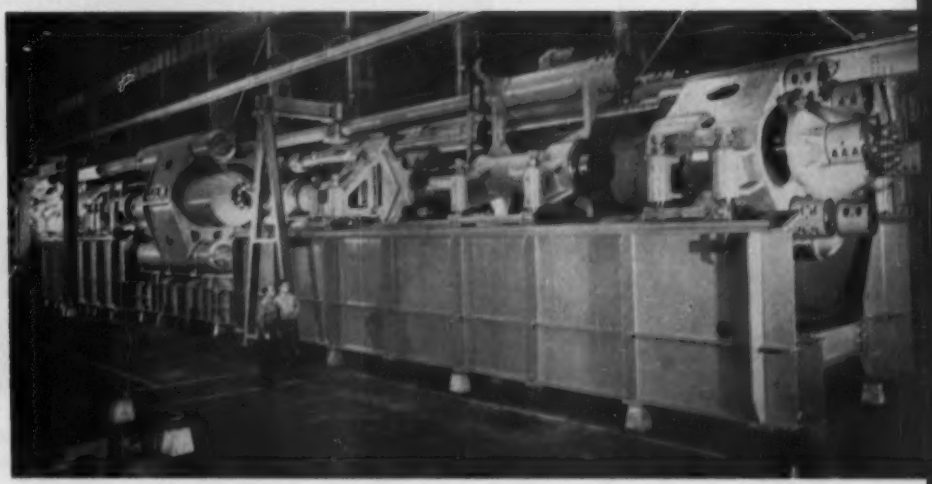
The heavy extrusion and forging presses now being completed for the Air Force will be used to mass produce airframe components. Design engineers have been looking forward to using larger one-piece extruded and forged shapes that are stronger and lighter than composite ones.

These methods of working with aluminum, titanium, steel and other alloys are expected to provide superior and more economical production techniques than present conventional methods.

In the extrusion process a metal billet is squeezed under pressure through a die to give it a desired shape. A wide variety of hollow and solid shapes can be produced by changing the die.

Press Specifications

Capacity	8,000 tons hydraulic pressure
Length	174 ft with hydraulic equipment, controlling mechanism and run out tables
Width	18 ft 2 in.
Height	18 ft
Weight	4 million lb
Operating pressure	4500 psi
Hydraulic medium	Water with a small pct of protective oil
Stroke	
Main cylinders	12 ft
Mandrel cylinders	17 ft 2 in.
Maximum cycles per hour	24 cycles
Material to be extruded	Aluminum
Maximum billet size	15 in. diam. x 60 in. long
Maximum circular extrusion	17 in. diam.
Maximum flat extrusion	33 in. width
Maximum finish length of extrusion	85 ft



FIFTY heavy freight cars will be needed to ship 8000-ton extrusion press to plant site.

Cost-cutting accessories—

Bar and Rod Feeds Boost Machine Productivity

By J. E. Hyler, Consultant
John E. Hyler & Associates, Peoria, Ill.

◆ Efficient, automatic bar and rod feeders provide a constant supply of raw material for many machine operations . . . They let machine operators concentrate on end product quality.

◆ Modern feed units are controlled hydraulically, pneumatically, mechanically and electrically . . . Popular applications are for screw machines, cutoff bandsaws and welding rod coating equipment.

◆ AUTOMATIC BAR and rod feeds for different machine operations are growing in favor as aids to increased production. One recent bar feed development, particularly for turret lathe work, is the auxiliary use of "doughnut" design air cylinders, which are hollow through the center. They can be mounted concentrically, allowing bar stock to pass through both spindle and air cylinder.

Using such air cylinders to actuate the necessary collet chuck, any suitable bar feed attachment may be employed. The "doughnut" cylinders have a travel of ⅛ in., which is more than ample for use with precision collet chucks and mandrels. The smallest of these cylinders passes rod material up to ¾ in. in diam while the largest will pass stock up to 2½ in. in diam.

Some turret lathe bar feeds incorporate a rigid, heavy-duty hydraulic unit for effortless, finger-tip control of feeding and chucking. They

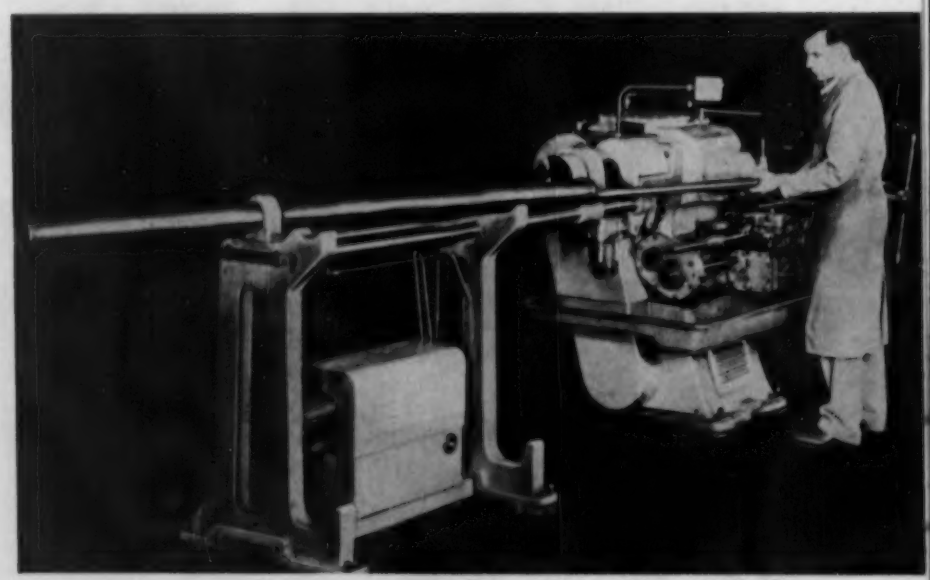


Photo courtesy Jones & Lamson Machine Co.

TO CONSERVE space, stock feed tube swivels outward, permitting front-loading of bars.

feature a side-loading, silent safety tube, and will handle round, square or hexagonal stock.

Side loading simplifies this operation and also saves floor space. The arrangement allows the spindle end of the silent tube to be removed from the stock feed chuck housing and swiveled outward. Stock can then be loaded from the front side of the machine.

The heavy-duty tube itself has a non-metallic lining to eliminate whip and objectionable noise. The lined tube is used chiefly for long, small diameter bars. The hydraulic unit on this feeding device has a motor-driven pump and solenoid-operated valves. A framework of steel support bars is provided for mounting the stock feed carrier.

Latch reduces stock whip

On larger diameter material, where the bar-supporting tube cannot be used, a three-roll adjustable stock support, with a safety latch, reduces stock whip to a minimum.

The use of magazines to store and load rod and bar stock in order to increase automatic screw machine output is not new. Some manufacturers of single spindle machines have long provided automatic magazines to free operators from the time-consuming loading and feeding job. Thus relieved, an operator can concentrate on obtaining better control of work quality and setup. In many cases he can also operate a larger number of machines.

As an example of rapid bar consumption with a magazine loading and feeding unit, one company recently tooled an automatic to produce about 240 small brass screws from each 10-ft length of ¼-in. diam bar stock. In making one screw per second, the 10-ft bar was used up in four minutes. An operator could not efficiently re-stock two to four of these automatic screw machine setups by hand.

By hand feeding the operator would obtain only about 60 pct net production. But the automatic rod magazine feeds a new bar through the spindle in just about three seconds after the last piece is made. Another second is allowed for trimming up the front of the new bar before screw production begins again.

Automatic rod magazines made by one company offer several features for versatility and efficiency. One feature is a ratchet disc on which there are two adjustable trip dogs. One dog starts the attachment motor at the proper time; the second stops the machine mechanically, with the chuck open. The dogs can be arranged so that the attachment motor goes into operation and a new bar of stock starts into the spindle while the last pieces are still being machined from the old bar.

Production of two or three final pieces from the old bar is allowed to prevent any possible interference. Moreover, the magazine has a control finger at the front end. This insures that the distance the bar is fed through the spindle is measured, not from the rear pusher, but from the contact made by the bar's front end with this control finger. Net result is that bars are usable even though overall length may vary as much as 12 in.

Magazine holds large supply

Another feature of this magazine is ample stock guide height of approximately 8½ in. so that the magazine will hold about 34 bars of ¼ in. diam stock. The machine operator or helper can load this magazine at any time; he need not wait until it is fully depleted. In the case of 10 ft bars being consumed at the rate of one every four minutes, a full magazine load would permit continuous running for about two hours.

The maker of this magazine unit has recently provided a new type of lining for their silent stock support. It is a special type of hard rubber, completely unaffected by oil, which permits bars to run more quietly than the old style support tube. Another advantage is that this material will not wear down the back end of bar stock, as occasionally occurs when an iron or steel stock pipe is used.

A roller feed and timing mechanism is sometimes used in conjunction with an automatic rod magazine. This device replaces the regular feeding mechanism ordinarily used on a single-spindle machine. It is advantageous where the part being made is long enough to require several movements of a regular feeding mechanism.

When one of these roller-feed units is used, it is mounted at the left hand end of the machine spindle. Two rollers, one above the other, feed the stock intermittently.

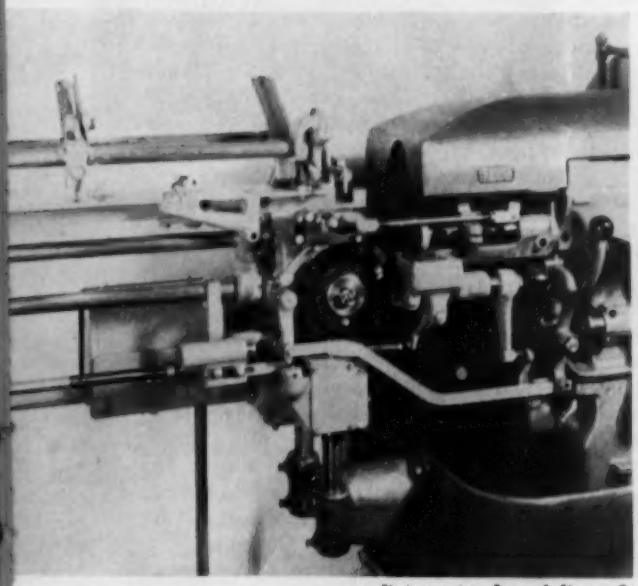


Photo courtesy Brown & Sharpe Co.

SCREW machine's automatic magazine has ratchet disc, adjustable dogs for positive bar feed.

Photo courtesy Kalamazoo Tank & Silo Co.

HYDRAULIC bar feed on metal cutting bandsaw aids cutting hexagonal stock to exact length.

Actually when the work-holding collet is closed, and the part is being machined, the two rollers are separated so that they exercise no feeding purchase on the bar. The stock simply revolves on its axis between the rollers. But when the work chuck opens, one roller automatically moves nearer the other. This movement continues until both rollers engage the rod, feeding it through the machine spindle and up to the stock stop.

Feed round or hex stock

When a rod becomes too short to be fed all the way by this roller feed unit, the automatic rod magazine feeds in a new rod. The chuck remains open until the new rod pushes the preceding remnant up to the stock stop.

An automatic rod magazine of the general type described may be mechanically or electrically controlled. Electrically controlled units are generally used for feeding smaller diameter material. Either type of magazine will feed round or hexagonal stock.

Highly efficient pneumatic bar feeds are also used on single-spindle screw machines. These feed maximum 12-ft lengths of stock until the last possible workpiece has been machined. Any too-short remnant is automatically ejected without any attention from the operator. The loading of these pneumatic feed units is also automatic, permitting an operator to tend a greater number of machines.

When a pneumatically fed stock bar is down to remnant length the machine clutch is automatically disengaged. The machining cycle stops with the spindle revolving and the collet open. The stock pusher immediately feeds a new stock bar through the collet to eject the remnant.

As soon as the new bar is positioned for the first cutoff operation, the machine clutch engages, the collet grips the stock and the machine is again in full-cycle operation. The new bar is pushed out just far enough for a tool to square the end and regular indexing cycles then continue until the bar is consumed.

With a standard second-operation clutch, feed-out length of the bar may be any amount desired in a single operation. There is no rebound when the bar meets the stop.

In loading these pneumatic units the lower half of the feed tube moves out from under the upper half to receive the bottom bar held in the magazine reserve. When loaded, the lower half of the feed tube returns to normal feeding position and the stock pusher begins its work.

Magazine loads quickly

The magazine used with a pneumatic feed unit of this kind normally holds enough stock for an 8-hour run. It will store up to 19 bars $\frac{5}{8}$ in. in diam, and as many as 96 bars $\frac{1}{8}$ in. in diam. It takes very little time to load the magazine, and only a few minutes to change from one stock size to another.

Pneumatic feeds are particularly suitable for use on polished or plated tubing or bar stock because they eliminate need for feed fingers. With feed fingers removed from the machine, no tool marks can be left on stock surfaces.

Another use for automatic bar feeding devices occurs in metal cutoff work on a bandsaw of the swinging frame type. The feed attachment raises the bandsaw frame to clear the diameter of stock being cut. The same attachment then opens the vise, feeds the stock to cutoff length, clamps the vise and lowers the saw frame at a controlled rate for making the cut.

This cycle is automatically repeated until the bar is completely sawed into required lengths. The device is hydraulically powered, needs a minimum of operator attention, and sharply increases saw blade life.

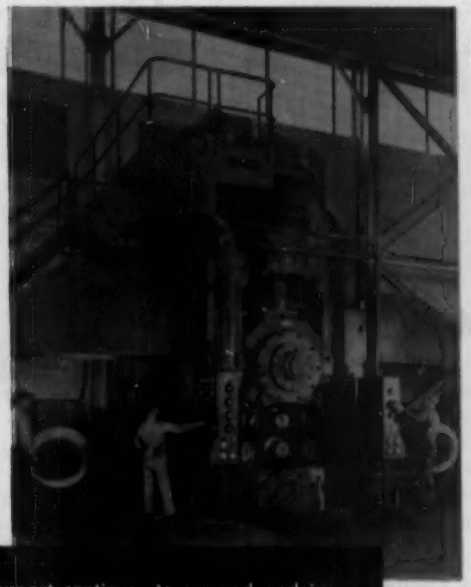
Occasionally some product is produced in sufficient volume to justify building special and highly efficient bar or red feeding equipment. The coating of welding rods is an example.

Primary wire for welding rods is coated by feeding it rapidly through a machine which has a special extrusion die head. The feeder device has a magazine to accommodate straightened wires already cut to required length.

Two agitating rolls, one slightly above the other, keep the wires moving in a vertical column. The rear end of each wire comes to rest on a roller or pin, and its front end drops into a set of power feeding or "pickup" rolls. These start the wire forward through a guide tube. In turn, this tube leads the wire directly into power rolls, which pass it to and through the extrusion die head where the flux coating is applied.

These examples are but a few of the many possible applications for fast, automatic bar and rod feeds to load material into machine tools and other production equipment.

Newport Steel KEEPS GROWING WITH ITS CUSTOMERS



New Cold Mill

Reversing Hot Mill

Newport continues to expand and improve its own facilities to match the amazing industrial development throughout the Middle West and South. Heavier, more precise hot mill facilities and an entirely new cold mill are but two examples. And with addition of facilities, more and better products become available. Our central location permits prompt and economical delivery by rail, truck or barge. Let us give you further facts about the benefits you can find at Newport Steel.

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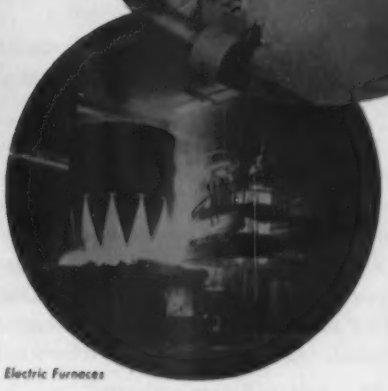
ECONOMICAL WATERAIL DELIVERY

Newport Steel is situated on the Mississippi-Ohio River system and the great Cincinnati rail hub. With the advantage of location, new river barge facilities and seven major railroads, Newport gives economical, dependable delivery to the entire area of the Middle West and South.



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Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
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Hot-Rolled Pickled Sheets
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Galvannealed Sheets
Colorbond Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
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Eave Trough and Conductor Pipe
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Newport Steel CORPORATION

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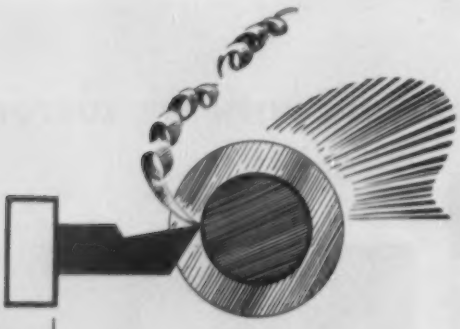
A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

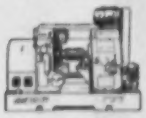


OUR JOB:

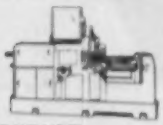
to provide the *Right Machine*

for **YOUR JOB**

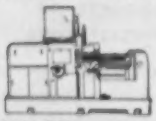
BAR AUTOMATICS
4 Spindle — 7 sizes, 1 to 7½"
6 Spindle — 9 sizes, ⅝ to 6"
8 Spindle — 6 sizes, ⅝ to 4"



CHUCKING AUTOMATICS
4 Spindle — 2 sizes, 10 and 12"
6 Spindle — 4 sizes, 3½ to 12"
8 Spindle — 2 sizes, 6 and 8"



TURRET LATHES
(Bar-Type — Fully Automatic)
Single Spindle — 3 sizes, 3½ to 8½



TURRET LATHES
(Chuck-Type — Fully Automatic)
Single Spindle — to 13" cap.

CHUCKING AUTOMATIC
Single Spindle ("Chuckmatic")
To 13" capacity

Management decisions regarding the purchase of new equipment are, and rightly so, reflecting an awareness of the fact that there are many areas of operation—other than actual machine design—which affect machining costs.

Machine performance, for instance, is being studied more closely in line with *the job to be done.* The buyer is becoming increasingly more conscious of the need for sales, service and engineering help—*when he needs it.* He is taking a closer look at the machine he is considering, in relation to the advantages of "operator familiarity"—will there be plenty of experienced help available.

Analyzing his problem and evaluating these important considerations, he usually finds *more* of the right answers at National Acme.

National Acme's experience in the design and manufacture of nearly 50,000 multiple-spindle bar and chucking automatics and fully automatic turret lathes provides a background of experience and versatility not to be found in less comprehensive lines of machines. This combination of *the RIGHT machine backed up by experienced and responsible engineering assistance* is hard to beat.

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FREE AIDS

New Technical Literature:

Catalogs & Bulletins

Motion draw press

A new booklet explaining the Clearing accelerated motion draw press, its purpose and the method of operation, is being offered. Features include low maintenance and simplified normal servicing. The press insures accurate and positive slide control during die setting, according to the booklet. Tables show length of stroke per minute and productive strokes per minute. *Clearing Machine Corp., Div. of U. S. Industries, Inc.*

For free copy circle No. 1 on postcard, p. 101.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 101.

Brazing

Low-temperature brazing is the subject of this new bulletin. Shown are the Homelite Model 17 chain saw, the clutch drum and the clutch drum assembly. Easy-Flo and Sil-Fos alloys are discussed. *Handy & Harman.*

For free copy circle No. 2 on postcard, p. 101.

Steel shot

"Tru-Steel" shot, a high-carbon, fully heat-treated steel shot, is the topic of this new folder. The shot's ability to perform the toughest cleaning jobs is stressed. It may also be used for peening. Advantages include savings on abrasive consumption, parts replacement, machine down time and transportation costs. Specifications are included. *Steel Shot Producers, Inc., Sub. of Pittsburgh Crushed Steel Co.*

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ERIE

In the good old days

WHEN GRANDPA RAN THE BIG FORGING HAMMER

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Ohio Packard OF WARREN

Nice people, but "very exacting in their demands", according to our President.

Other names, like these were on our list of Customers:

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Maybe we're "name-droppers", but those grand old names helped establish us as the

THE GREATEST NAME IN FORGING HAMMERS

A 100-lb. Erie self-contained Hammer of about 1910

"IN OUR 60TH YEAR"

ERIE FOUNDRY CO.

ERIE, PA.

FREE TECHNICAL LITERATURE

Washers

Elementary explanation of how the tightness of assembled parts is developed, and how the loss of tightness may be substantially reduced is put forth in a brochure being offered by the Spring Washer Institute. The brochure shows how the spring action of Spring Lock Washers overcomes the mechanical deficiency that often exists in bolts, nuts and screws. *Spring Washer Institute.*

For free copy circle No. 4 on postcard, p. 101.

Products

P&H products are featured in this new bulletin. The booklet gives essential facts and capacities on overhead cranes, electric and chain hoists; arc welders, welding electrodes, welding positioners, truck cranes, power shovels, electric shovels, soil stabilizers, diesel engines, and also details on P&H prefabricated homes. *Harnischfeger Corp.*

For free copy circle No. 5 on postcard, p. 101.

Tubing

Pertinent information needed for the selection and application of 46 principal analyses of tubing is contained in this new tubing guide. The analyses are classified in five groups, stainless steel, nickel and nickel alloys, carbon and alloy steels, beryllium copper, and titanium. A short summary of the principal properties of each analysis and its normal production limits is given. *Superior Tube Co.*

For free copy circle No. 6 on postcard, p. 101.

Colloidal graphite

The use of 'dag' colloidal graphite as a parting compound is discussed in this new bulletin. 'Dag' dispersions possess unique physical properties which minimize corrosion and metal pick-up and prevent sticking, galling and freezing of parts, according to the bulletin. They are being used as release agents for glass molding, on clutch plate separators, as anti-weld coatings and gasket coatings, as anti-seize for screw threads, in corrugated boxboard manufacture, rubber molding, foundry work and other operations. *Acheson Colloids Co., Div. of Acheson Industries.*

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Turn Page

IN TODAY'S forge shop

WHERE FASTER FORGING REQUIRES AN ALL-STEEL HAMMER

WHEN each hammergang's 'down time' is so costly if mechanical failure sets in,

WHEN competitive bidding in mass production requires every effort to be costed at minimum

WHEN product perfection must be taken for granted as buyers specify less and less tolerance allowances

The tireless performance of the all-steel construction (in all stressed parts, upper works, frames, and anvils) makes

ERIE, MORE THAN EVER, THE GREATEST NAME IN FORGING HAMMERS

50,000 lb. Erie Steam Hammer — the largest ever built

"IN OUR 60TH YEAR"

ERIE FOUNDRY CO.

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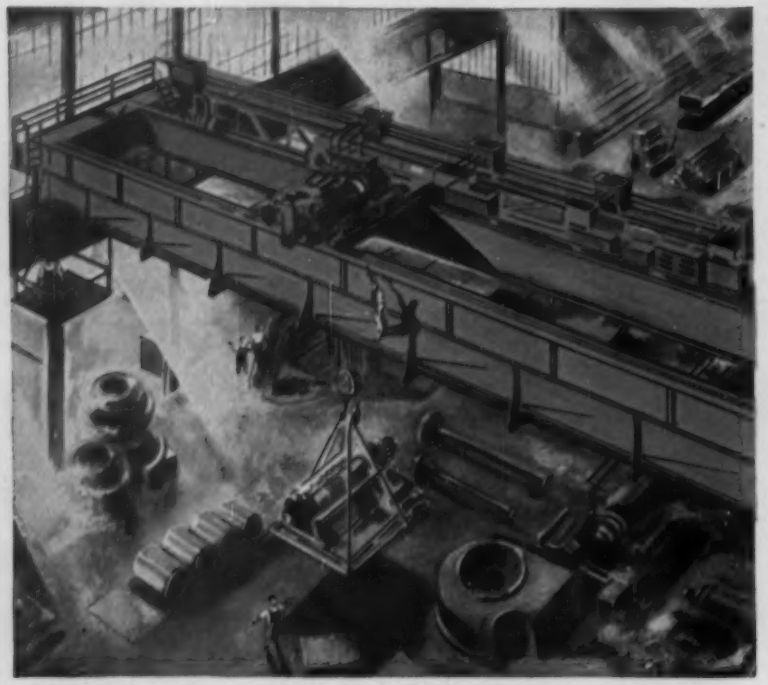

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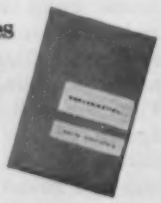

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THE MORGAN ENGINEERING COMPANY, ALLIANCE, OHIO

FREE TECHNICAL LITERATURE

Hyster hints

In this 20-p. brochure, Hyster Co. describes the Hyster Hystaway Excavator-Crane mounted on new or used Caterpillar D6, D7 or D8 track-type tractors. The illustrated booklet explains on-the-job advantages of the Caterpillar-built tractor with dozer blade and Hystaway which can be quickly converted to either shovel, backhoe, dragline, crane, clamshell or pile driver. Specifications of each Hystaway job attachments are given. *Hyster Co.*

For free copy circle No. 8 on postcard, p. 101.

Threading machine

The 6B Landmaco threading machine is discussed in this new folder. Among advantages are precision construction, pick off speed change gears, good lubrication system and chip removal ease. Carriages, operating controls, die heads, tangential chasers, motor drive and coolant system are discussed. Specifications are included. *Landis Machine Co.*

For free copy circle No. 9 on postcard, p. 101.

Safety suits

Two new styles of MSA decontamination safety suits are described in this new bulletin. One is made from a flexible butyl-fairprene material, and the other of neoprene-fairprene fabric. The first offers protection against nitrobenzene, nitrotoluene compounds, and aniline, and the second offers protection against light concentrations of acids. *Mine Safety Appliances Co.*

For free copy circle No. 10 on postcard, p. 101.

Vacuum

Spencer vacuum for industry is the subject of this new bulletin. Stationary and portable vacuum equipment is covered. New features include a table for the rough calculation of the horsepower required for any specific job, a complete outline of the latest methods of automatic and hand dumping of refuse, and a section on the application of vacuum to machine design. *Spencer Turbine Co.*

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Turn Page

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Look for the blue product marking which is the identifying color for Vanadium in Vancoram's original color coding system.

Each of these bags contains 25 lbs. of vanadium for handy cost-saving additions to furnace, cupola or ladle.

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CONTAMINATION AND WASTE ELIMINATED—The ferrovanadium is confined to its own bag . . . made of strong, white, cotton fabric with a crepe-paper interlining that's adhered to the outer covering with a special moisture-resisting adhesive. Bags eliminate waste common to other types of packing.

INVENTORY AND HANDLING PROBLEMS SIMPLIFIED—Standard weight of each bag means quicker inventory. Palletized shipments can be handled quickly and easily by fork truck or crane. Each bag is clearly labeled for ready identification.

UNIFORMLY HIGH-GRADE MATERIAL—Vancoram ferrovanadium is produced under strictest quality control and thus is guaranteed to be physically clean and of uniform high quality.

Bagged ferrovanadium is another example of the way VCA works to help steelmakers make better metals faster—and at lower cost. Contact your VANADIUM CORPORATION representative for further information on Vancoram ferro alloys.

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picks up hauls dumps puts down

WHAT IT IS

The BROOKS LOAD LUGGER is a flat-bed truck body with a pair of hydraulic-powered hoisting arms, which is mounted on any truck chassis of suitable capacity. Standard models lift pay loads of up to 18,000 pounds at a time. Some special-purpose models lift much heavier pay loads.

LOAD LUGGER CONTAINERS are patented, tilt-dumping containers with deep, leak-proof bottoms. Capacities range from 1½ to 14 cubic yards for standard models. Some special-purpose models are much larger. A variety of open and closed containers handle solid materials, powders, sludge, liquids, and gases. Special pallets handle free-standing and unit-packaged materials.

Controlled by the driver from his cab, the truck-mounted Brooks Load Lugger lifts a Load Lugger Container onto its steel deck, carries it well forward for correct load distribution, cradles it between steel sidewalls for travel safety, hauls it away, dumps or spreads its contents, then returns the container and puts it down.

HOW IT IS USED

The LOAD LUGGER SYSTEM of materials handling calls for a number of Load Lugger Containers to be placed at points of need. These containers collect material as it accumulates, which reduces handling and eliminates loading crews. Then, loaded containers are picked up, hauled away, dumped, and returned on a regular schedule by a truck-mounted Brooks Load Lugger, which replaces many conventional trucks and eliminates loading time formerly required.

WHO USES IT

Industrial operations all over the country (quarries, foundries, steel mills, paper mills, refineries, chemical plants, brick plants, metal fabricators, etc.) use this versatile equipment to handle raw materials, finished products, and waste materials. Contract haulers of wet and dry refuse prefer Load Lugger equipment, as do scrap metal dealers, construction contractors, cemetery operators, and sugar cane growers. Government approval is evidenced by the many municipal, state, and federal installations. New uses and new users, such as cable reel handling by power and telephone companies, are constantly coming into the picture.

WHY THEY LIKE IT

The Brooks Load Lugger has no cumbersome superstructure or extra operating gadgets because of its patented simplicity, clean design, and sturdy construction. This results in a lower first cost, lower maintenance costs, the ability to carry more pay load on a given truck chassis, and a clear deck for multipurpose use. Its double-acting hydraulic cylinders, four-point container suspension, secure container cradling, and fully controlled tilt dumping are important contributions toward greater operational safety.

Load Lugger Containers are job-designed and job-proved. They are low and easy to load to full rated capacity. They dump clean because they are tilt-dumping, and they have no bottom openings to allow messy or insanitary leakage. Appropriate models are dust-proof, rat-proof, fly-proof, and almost odor-proof.

BROOKS EQUIPMENT & MFG. CO. 2034 DAVENPORT ROAD KNOXVILLE, TENNESSEE

FREE TECHNICAL LITERATURE

Vacuum pumps

The new Kinney Model KMB mechanical booster high vacuum pumps are described in this new bulletin. The bulletin describes the two-stage construction of the pumps. No sealing fluid is used in the first stage, producing a clean and fast pumping speed with low power consumption. Operating characteristics in metallurgical vacuum processing, metalized coating, foundry research and pharmaceutical applications are explained. Capacities, dimensions and weights are given. *Kinney Mfg. Div., New York Air Brake Co.*

For free copy circle No. 12 on postcard, p. 101.

Emery indicator

The 19½ inch Emery load indicator for load weighing or pressure applications is the subject of this new folder. Features include easy-read graduations, bifocal pointer, bold numbers, accuracy, calibration, fixed dial, zero adjustment, and temperature compensation. Indicator dimensions are given. Available dial ranges, typical graduations and other specifications are included. *A. H. Emery Co.*

For free copy circle No. 13 on postcard, p. 101.

Lubrication

Lubrication of electric motors' ball and roller bearing type, is the topic of this new bulletin. The bulletin describes proper methods for lubricating and cleaning ball and roller bearings on electric motors. How to prolong the life of bearings is explained in the bulletin. *New York & New Jersey Lubricant Co.*

For free copy circle No. 14 on postcard, p. 101.

Spectracord

The Warren Spectracord is the subject of this new bulletin. A fast recording-spectrophotometer, the Spectracord expedites product control. The instrument's electronic recording and control systems are explained. A diagram shows the installation of a DU-type monochromator in the Spectracord. Specifications are included. *Fisher Scientific Co.*

For free copy circle No. 15 on postcard, p. 101.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on page 96

Chemical cleaning

Dowell's method of chemical cleaning for industrial equipment is described in this new bulletin. Advantages listed in the bulletin include the cutting of time and costs and dependable maintenance cleaning. *Dowell, Inc.*

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Speed reducers

Winsmith, Inc. has a new catalog CHW-654 on their "C" Line Worm Gear Speed Reducers. The advantage claimed for this "C" Line by the manufacturer is that greater capacities have been attained without increasing the size of the units. The catalog describes 5 sizes in this line that are available in three models: worm on top, worm on bottom and vertical. These 5 sizes are within the 1/100 to 5 horsepower range and in a ratio range of 5:1 to 77:1. *Winsmith, Inc.*

For free copy circle No. 17 on postcard.

Atkomatic facts

An illustrated bulletin covers electric valves. The valves are for remote or automatic control on low or high pressure lines. Advantages assure elimination of damaging water hammer and ease of maintenance. The unit is packless and operates with slight pressure drop across the seat. Instructions are included. Several types of valves are shown and their specifications are given. A dimension chart, uses and applications are contained. *Atkomatic Valve Co., Inc.*

For free copy circle No. 18 on postcard.

Steel sheets and wire

A special booklet on steel sheets and wire is available from Continental Steel Corp. This pocket-size guide contains wire specifications—sizes, tempers, shapes and finishes of wire, and valuable tables of sizes, weights, and lengths of round steel wire by steel wire gauge. Also illustrated and described are several types of Continental steel sheets, Continental Galvanized, Copper Steel, Konik Steel, Galvannealed and Dull Coat. *Continental Steel Corp.*

For free copy circle No. 19 on postcard.

Tool holders

KDK tool holders and bars are discussed in this new brochure. Set-up time has been reduced and machine time has increased 35% according to the booklet. Stressed is the quick interchange of holders and preset bars, possible because of the standard dovetail slot on the KDK body mounted on the Bullard boring mill. *KDK Products.*

For free copy circle No. 20 on postcard.

Malleabrasive

Malleabrasive, the blast-cleaning abrasive, is the subject of this new booklet. Malleabrasive combines the toughness of malleable iron with lower hardness and reduced brittleness, according to the booklet. Advantages include lower abrasive consumption, reduced parts consumption and better cleaning. *Globe Steel Abrasive Co.*

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Turn Page

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41	42	43	44	45	46	47	48	49	50
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Wire enamel

"Alkanex" wire enamel, the new material currently produced at the Chemical Materials Dept., General Electric Co., is regarded as a major development in electrical insulating materials. The new high-temperature coating is described as being capable of withstanding 155°C heat for 3000 hrs without loss of di-electric strength. Lifetest data indicates this heat-resistance will permit design of electrical equipment with increased ratings and greater compactness. Technical information may be obtained. *Chemical Materials Dept., General Electric Co.*

For free copy circle No. 22 on postcard.

Bending rolls

Wysong bending rolls are discussed in this new catalog. Standard features include sturdy frames, accurately machined rolls, worm gear drive runs in a continuous bath of oil, good lubrication, safety treadle, drop-end and easy-to-read indicators. Single pass rolling, two pass rolling and cone rolling all are discussed. Optional features are described. Complete specifications are included. *Wysong & Miles Co.*

For free copy circle No. 23 on postcard.

Stock list

U. S. Steel Supply Div., U. S. Steel Corp., has a new stock list for distribution. It incorporates a new design, combining four books in one binding. The list is divided into four sections entitled special metals, industrial supplies, prices-references and carbon steels. *U. S. Steel Supply Division.*

For free copy circle No. 24 on postcard.

Gages

Sheffield limit-type gages are covered in this new catalog. Among gages featured are plain cylindrical plug gages, taper plug and ring gages, plain cylindrical ring gages, adjustable limit gages, thread gages, thread checking equipment and pipe thread gages. Engineering data and specifications are included. *Sheffield Corp.*

For free copy circle No. 25 on postcard.

FOR MORE LITERATURE
Many companies offer free literature and other information in their advertisements. For the names of these firms see the company listings in the index of advertisers.

Safety equipment

Complete information on all Bullard Safety Products has been prepared. The catalog, No. 55, contains photographs of the items being explained, along with easy-to-read technical data. A listing of addresses and phone numbers of Bullard Distributors also appears. *E. D. Bullard Co.*

For free copy circle No. 26 on postcard.

High-speed counter

A new mechanical counter, the Model 550 Rayconter, is described in this new leaflet. The counter is capable of speeds up to 3000 per minute. It displays the counts by means of four radial pointers on four concentric scales. The unit features a new type of pawl and pinion drive with an interlocking device which eliminates errors from carry-over and prevents multiple counts. *Raycon Corp.*

For free copy circle No. 27 on postcard.

Refractories

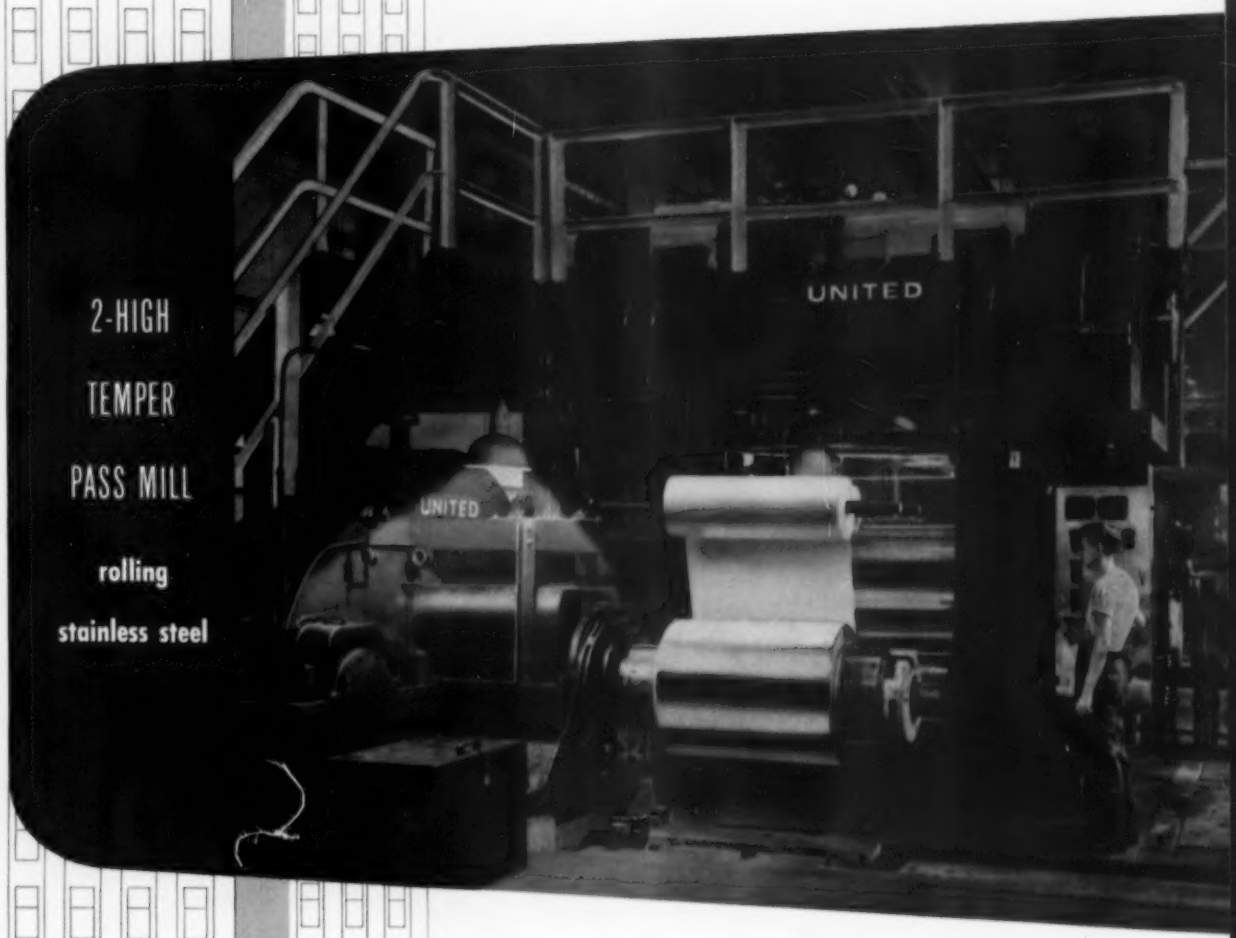
Properties of super refractories is the topic of this new booklet. It gives the latest physical and chemical properties on super refractories by Carborundum. Lists of applications and pertinent charts and tables are included. *Carborundum Co.*

For free copy circle No. 28 on postcard.

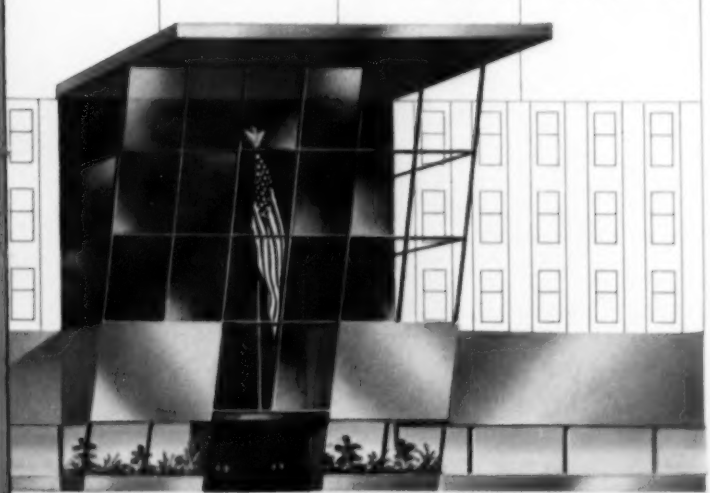
Sintering equipment

Sintering, pelletizing and sinter cooling equipment is covered in this new bulletin. The process and equipment which incorporates improvements is shown and described. *Dravo Corp.*

For free copy circle No. 29 on postcard.



STAINLESS STEEL BUILDING ENTRANCE



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UNITED

ENGINEERING AND FOUNDRY COMPANY

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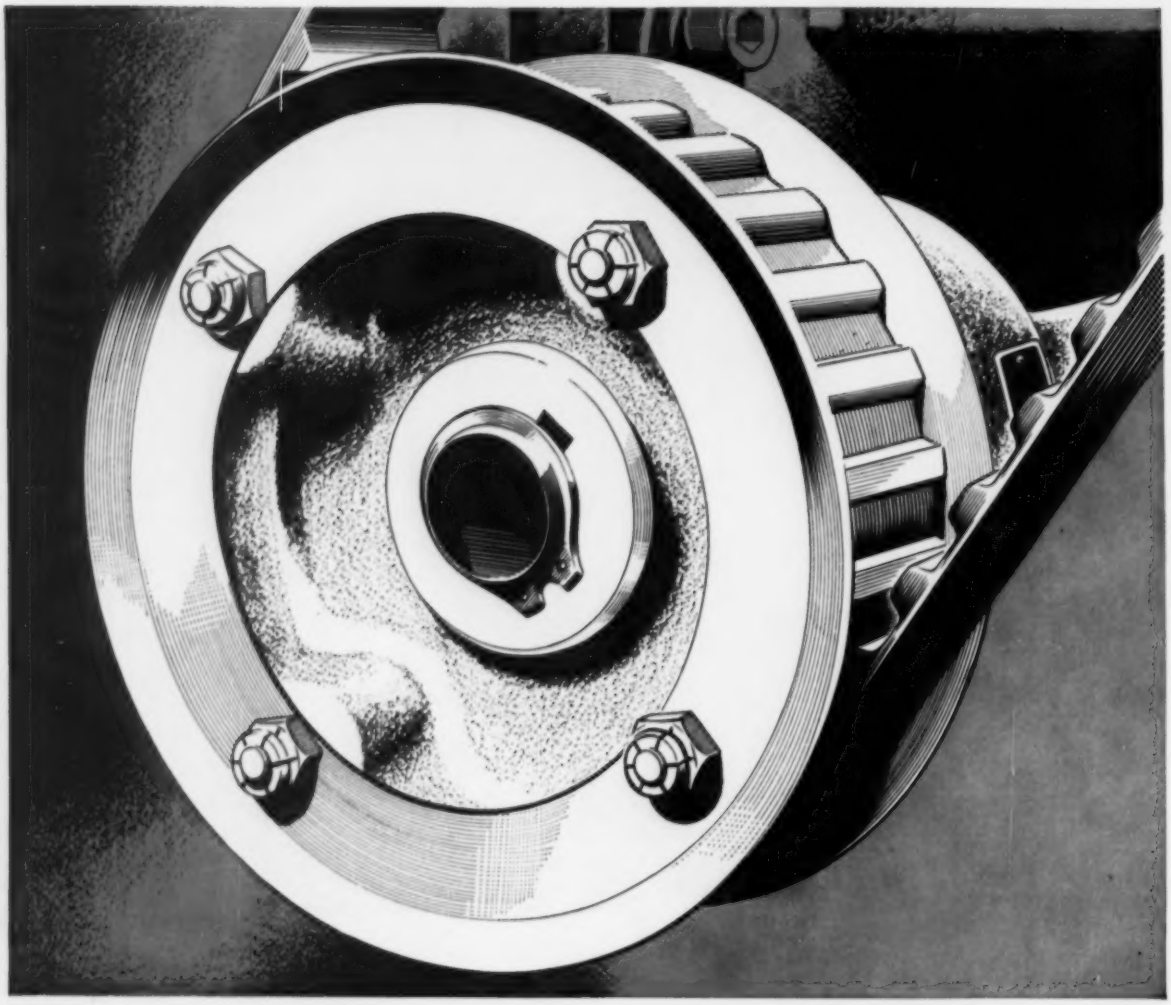
Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

UNITED *can serve you no matter where in the world you are.*

FLEXLOC AT WORK



MORE AND MORE FLEXLOC LOCKNUTS are being used to hold assemblies like this one together. This modern timing belt drive combines the flexibility of a steel cable belt with the positive action of a silent chain drive permitting its use at speeds up to 15,000 rpm.

FLEXLOC Self-Locking Nuts offer the same positive action as the drive. Once the locking threads are fully engaged, the nuts won't work loose, regardless of the vibration encountered. And FLEXLOCS are reusable.

FLEXLOCS are available in a wide range of sizes in any quantity. Stocks are carried by leading industrial distributors everywhere. Write for Bulletin 866 and samples for test purposes. STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

DO YOU KNOW? Standard FLEXLOCS clean rough threads on bolts, and make them even better. The locking threads on all-metal FLEXLOCS are not chewed up when used on rough bolts.

Standard FLEXLOCS lock securely on bolts varying in diameter tolerances. The all-metal, resilient locking sections of the nut accommodate themselves to the diameter tolerances.

Standard FLEXLOCS are one piece, all metal. They are not affected by temperatures to 550°F. Nuts lacking these features have a more restricted temperature range.

Standard FLEXLOCS lock securely—stopped or seated—when 1½ threads of a standard bolt are past the top of the nut.

Standard FLEXLOCS are not affected by moisture, oil, dirt or grit. They lock efficiently under all conditions, regardless of the vibration encountered.

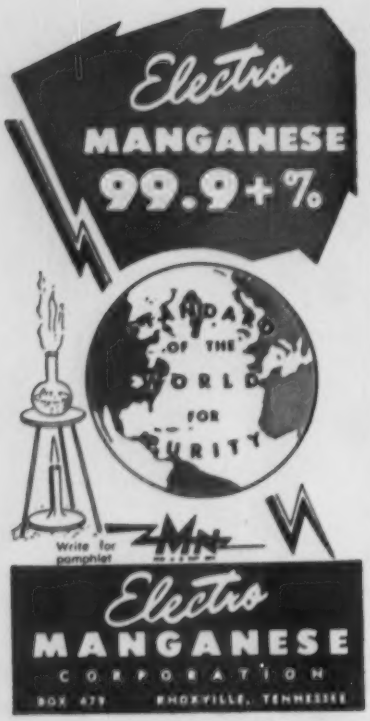
FLEXLOC®
LOCKNUT DIVISION
sps
JENKINTOWN PENNSYLVANIA

Mighty Mammoth

This huge Planer Type Milling Machine embodies the highest accuracy standards for which GRAY is world famous. Its great precision is coupled with brute power, hogging capacity. A host of new GRAY features make this mighty mammoth a miracle of modern milling. Great simplicity of control with unique unit head versatility are further reasons why

Quality doesn't cost . . . it pays.

The G. A. GRAY Co., Cincinnati, Ohio



STRUCTURAL STEEL FABRICATORS

POLLASKY AUTOMATIC SPACERS insure huge savings in the fabrication of steel and will cut your costs of punching holes in iron. Rapid punching using only ONE OPERATOR. The spacing bars used can be rapidly set and eliminate all templet making and marking of iron. These Spacers operate on forward and return travel allowing angle iron to be punched in both legs at one handling. Simple to operate. These Spacers can be designed to operate with your present punch in any size to handle your range and length of work.

STEEL STAMPING PLANTS

Set up with a blanking press this AUTOMATIC SPACER will feed any size or length of plate. A series of blanks can be cut on the forward travel and a new series of blanks cut on the return travel. Can also be used with a shear or saw for cutting off operations. Full automatic operation. Consult us for special applications.

POLLASKY ENGINEERING CO.
3802 N. 38TH STREET
MILWAUKEE 16, WIS.

POWER: "Dry Fluid" Drive

Unusual new drive uses spherical steel shot as the fluid . . . Does not slip at normal speeds. Can be adjusted to slip for overloads.

A new development in industrial power transmission, called Flexidyne, and described as a *dry* fluid drive, is announced by the Dodge Mfg. Corp. of Mishawaka, Ind.

Major advantages claimed over other fluid type drives are that at normal operating speeds it does not slip. At the same time, in the case of an overload, it is slippage which gives protection.

Originated in Europe and redesigned by Dodge to American standards the drive will soon be available from stock through regular Dodge distributors.

Has Wide Application

It is claimed to have wide application for industrial drives involving heavy inertia and shock loads on such equipment as compressors, centrifuges, conveyors, crushers, and machines used in metal working plants, textile mills and the oil fields.

The Flexidyne Drive is made up of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the flow charge, which acts very much like a fluid. This flow charge transmits power from the housing to the rotor. The flow charge is easy to seal in, has a high density and can stand relatively high temperatures.

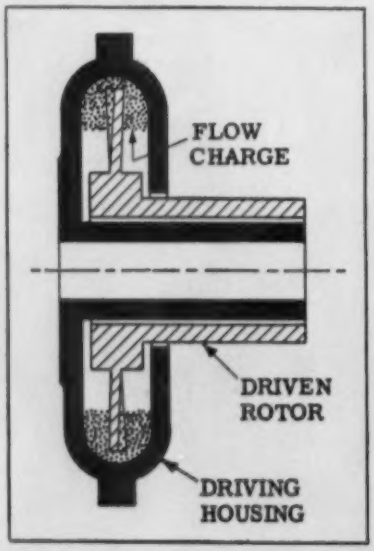
The amount of the flow charge determines the torque capacity. Because it is easy to vary the amount of this charge, the drive will give the exact starting torque needed for anything from the smoothest to the fastest start.

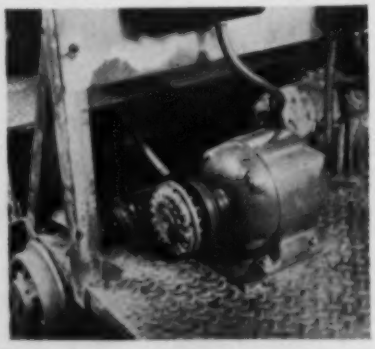
Adjust for Protection

Accurate overload protection is assured since its settings can be adjusted to slip at anywhere from a gentle 20 pct over full load torque to peak motor torque. During starting and overload periods the current draw is at a minimum

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 101. Just indicate the page on which it appears. Be sure to note exactly the information wanted.





Schematic of drive and how it looks installed . . .

because with the standard setting the motor is never pulled down to less than 90 pct of synchronous speed.

These results derive from the drive's unusual design which produces constant torque for a given input speed, regardless of the percentage of slip between the rotor and the housing.

Other advantages claimed are uniform performance regardless of changes in the surrounding temperature, long life and an overall low operating and maintenance cost.

Aluminizing:

Iron and steel wire can be continuously coated

A practical process for the continuous hot-dip application of aluminum to iron and steel wire has been developed by the Page Steel & Wire Div., American Chain & Cable Co., Inc. The process is based on the fluxing action of complex salt compounds applied to the wire surface from a hot aqueous solution.

Steps in the Acco aluminizing process consist of: (1) Preheating. (2) Cleaning and pickling in hot acid solutions. (3) Rinsing in hot water. (4) Application of flux by immersion of wire in a hot aqueous salt solution. (5) Immersion in molten aluminum bath, the wire being withdrawn vertically to assure the uniformity of the applied aluminum coating.

Wire surface cleanliness is important in the application of continuous hot-dipped aluminum coatings and pretreatment is necessary. Residual films of drawing lubricant on the surface of hard drawn wire are removed by heat imparted to the wire during pretreatment. This also accelerates cleaning and pickling in acid solutions.

Remove Surface Dirt

Immersion of the preheated wire in acid cleaning and pickling solutions permits the rapid removal of all oxidized surface contaminants including the remnants of lime.

PEARLITIC MALLEABLE CASTINGS as engineers see its many advantages

DESIGN ADAPTABILITY: Because of its good fluidity, it can be cast in thin sections and in complicated shapes.

HIGHER STRENGTH: Ultimate strengths range between 60,000 and 90,000 psi; yield strength between 40,000 and 70,000 psi.

EASILY MACHINED: Machinability index (B1112 Steel = 100) ranges between 80 and 90.

WEAR RESISTANCE: Withstands excessive wear under heavy loads at high speeds.

LOCALIZED HARDENING: Sections of the casting can be flame hardened or induction hardened before or after machining.

BEARING PROPERTIES: Good non-seizing properties in metal-to-metal contact.

FINE FINISH: Can be given a very smooth finish where desired.

You will find many applications for Pearlitic Malleable castings—particularly as a replacement for forgings, stampings and weldments—where reduced weight, less machining time, fewer assembly operations and better appearance are important production and sales considerations.

A-9377

NATIONAL MALLEABLE AND STEEL CASTINGS

M&S EST. 1900

COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

How about Malleable ?

Take Advantage of This Unusual Combination of Properties

Strength	Excellent Machinability
Toughness and Ductility	High Impact Resistance
Rust and Corrosion Resistance	Versatile Castability

• Malleable iron is a cast ferrous alloy heat-treated to provide a remarkable combination of properties. Malleable castings are both strong and tough—flow under excessive compressive and transverse loads, seldom fracture.

• Malleable castings machine easier than any other ferrous material of comparable strength and toughness.

• Malleable iron can be cast into intricate shapes close to final form, greatly reducing machining costs and eliminating complicated and costly assemblies.

• Malleable castings are highly resistant to atmospheric corrosion and are widely used for products used outdoors.

• Modern foundry methods and careful scientific casting control assure you of uniformly high quality castings for better products.

For complete specifications and tolerances for both standard and pearlitic malleable castings, write to the Malleable Founders' Society.

Malleable FOUNDERS' SOCIETY

1800 Union Commerce Building Cleveland 14, Ohio

Flux is a hot aqueous solution of zirconium and titanium fluorides . . .

Best results have been obtained with hot hydrochloric acid solutions, with temperature and acid concentration suited to wire size, speed of travel, size of equipment and nature of wire surface.

After cleaning and pickling, the wire is rinsed in hot water to remove iron salts and dirt.

Flux Heat Drys Coating

The flux used in the Acco aluminizing process is a hot aqueous solution of zirconium fluorides, titanium fluorides or combination of both with an alkali metal such as sodium or potassium. The temperature and concentration of the flux varies with the diameter and speed of the wire. It is desirable to maintain temperatures high enough to dry the fluxed wire so it air dries after leaving the bath. The flux coating must be dry before the wire enters the bath of molten aluminum to avoid agitation to prevent accelerated formation of aluminum oxide skimmings.

The fluxed wire enters the molten aluminum bath, passes under a sinker, and leaves the bath vertically to assure uniformity of coating. The time of immersion in the molten aluminum affects the thickness of the aluminum - iron alloy layer formed.

Use Low-Frequency Furnace

The molten metal is contained in a low frequency electric induction furnace. High purity alumina brick is the refractory used for the furnace lining. Advantages of this type of furnace include long refractory life, uniformity of temperature, absence of dross sediment on the bottom of the furnace and close temperature control. Daily cleaning of the inductor channels to remove aluminum oxide as well as the periodic shutdown and partial draining of the molten metal to permit the removal of aluminum oxide from the channel connecting the inductor channels are adverse characteristics of this type of furnace.

TECHNICAL BRIEFS

Commercially pure aluminum or alloyed aluminum may be used. A bath of commercially pure aluminum may be maintained at 1250°F to 1400°F for the application of satisfactory coating; the addition of some alloys permits a reduction in the operating temperature.

Silicon Improves Adherence

Hot-dipped aluminum coatings consist of an alloy layer resulting from a diffusion process and an outermost layer having a chemical composition similar to that of the bath. The outer layer has a cast structure. The inner alloy layer is hard and brittle. These conditions in combination with alloy layer thickness exert a controlling influence on coating ductility and adherence.

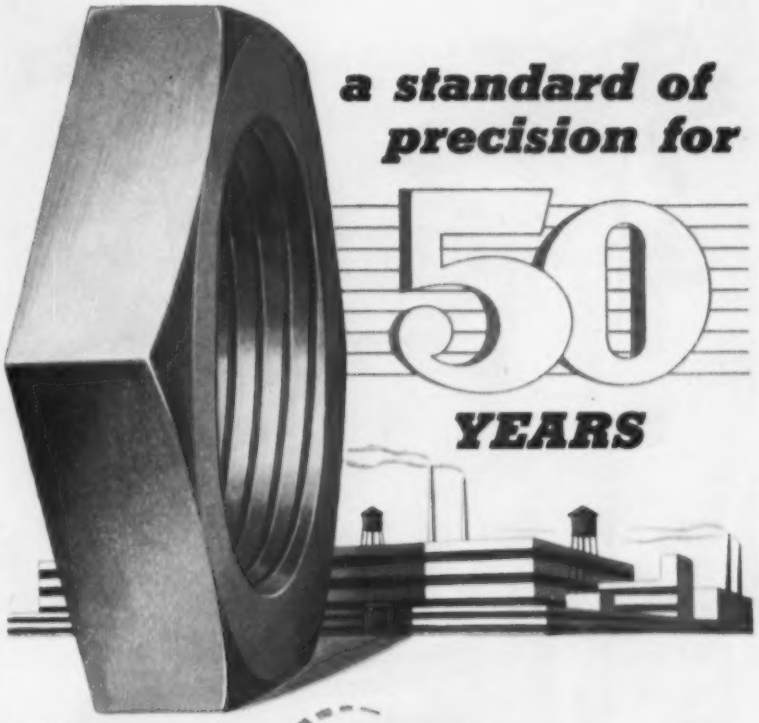
To improve these properties, the thickness and hardness of the alloy layer, which is responsible for brittleness, must be reduced. Alloy layer thickness can be reduced to some degree by decreasing the immersion time of the wire in the bath and by reducing the bath temperature. Alloy layer hardness may only be reduced by the addition of alloying elements to the bath.

Effective Additives

Investigators have shown that silicon and beryllium are the most effective additives in reducing the hardness and inhibiting the formation of alloy layer. The toxicity of beryllium introduces serious problems in connection with its use. In continuous wire coating operations, major improvement in ductility and adherence of the coating is evident with silicon additions up to about 2.5 pct. Above this amount, no further significant benefits are evident.

Coating weight or thickness, smoothness or regularity, are controlled by the speed of travel of the wire during the application of coating. As the speed of travel increases, the weight of applied coating increases and becomes more irregular.

At high speeds, the coating



"Fischer Turned"
BRASS AND ALUMINUM NUTS

HEXAGON CAP NUTS

KNURLED THUMB NUTS

DOUBLE CHAMFERED HEXAGON NUTS

SINGLE CHAMFERED HEXAGON NUTS

Fifty years of manufacturing "know-how" stand behind Fischer brass and aluminum nuts. Combining this experience with special high-speed machinery, Fischer supplies precision *turned* nuts at prices competitive with those produced by other methods . . . cuts normal delivery time to absolute minimum.

New economies in assembly operations are possible with Fischer nuts because each is burrless . . . tapped square with the face . . . cleaned and degreased . . . countersunk on both sides . . . tapped to Class 2 tolerances.

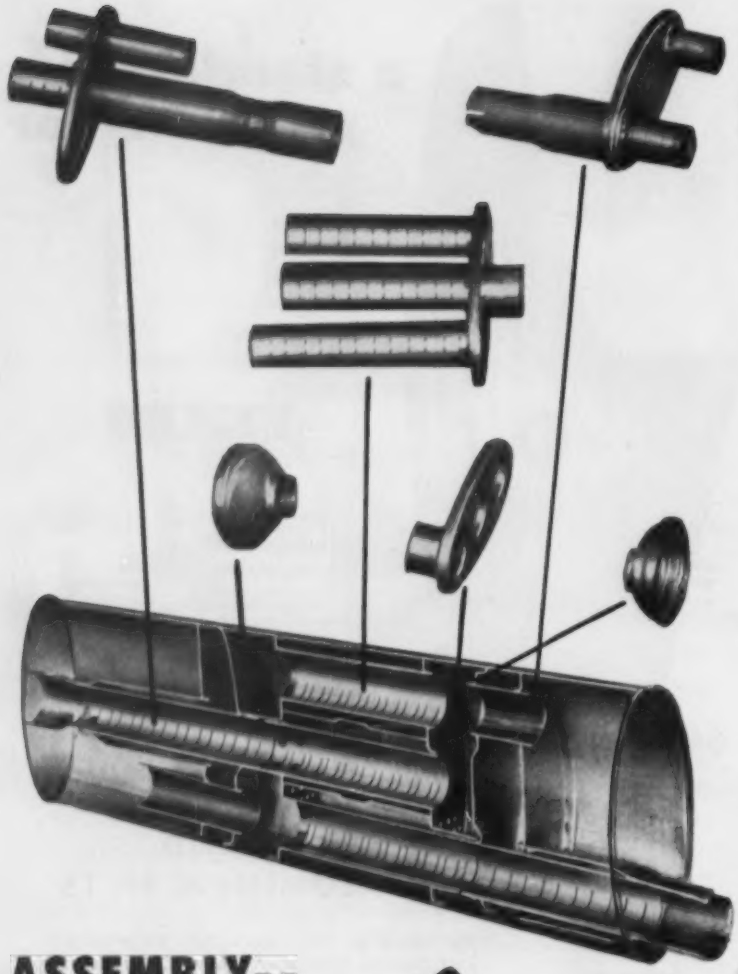
Specify Fischer turned brass and aluminum nuts to fill all of your requirements. An extensive line of standard nuts is offered, and "specials" are produced with speed and economy . . . many types so regularly that they have virtually become "standards" at Fischer.

Write today for new complete catalog.

1905-1955 50th ANNIVERSARY FISCHER SPECIAL MFG. CO. CINCINNATI, OHIO

C-216-FS

Fischer
SPECIAL MFG. CO.
445 MORGAN ST. • CINCINNATI 6, OHIO



ASSEMBLY--
WELDING TIME 6 SECONDS!

Six individual baffle assemblies are inserted into muffler shell, accurately positioned and securely welded. Total elapsed time for completed job is an amazing six seconds.

In this short interval 96 spot welds are made — 16 welds each to the six baffle assemblies.

This Federal welder replaced several individual spot welders, eliminated a great amount of handling and boosted production by some 200 per cent.

It's the type of thing Federal engineers have been doing consistently for some of America's leading fabricators. Why not talk over your welding operation with a Federal man. There's no obligation and chances are he can show you how to reduce your production costs. It's the big reason why **Federal stays — "First in Resistance Welding."**

-Federal- WELDERS ®
Warco WELDERS ®

THE FEDERAL MACHINE and WELDER COMPANY
WARREN, OHIO

Size of wire influences coating characteristics . . .

varies in thickness which is probably caused by the flow of a relatively large volume of applied coating as well as vibration in the system. The heavier or thicker irregular coatings show a greater tendency toward cracking and peeling than do the thinner, smoother coatings.

While control of coating ductility and adherence is exercised by the reduction of the hardness and thickness of the alloy layer, for optimum coating characteristics the outermost layer should consist of a fine-grained matrix of aluminum or aluminum alloy, similar in composition to the molten bath, with the aluminum-silicon-iron or aluminum-iron compound well distributed as fine particles.

The size of the wire also exerts an influence on coating characteristics. For a given speed of wire travel, the larger the wire size the heavier or thicker and the more irregular may be the applied aluminum coating. In general, heavy or thick and relatively irregular aluminum coatings on the larger sizes of wire show a tendency toward brittleness.

Use Wrap Test

Hot-dipped aluminum coatings applied by the Acco aluminizing process are appraised for ductility and adherence by means of the Wrap Test in which the wire is wrapped around a mandrel whose diameter is multiples of that of the coated wire. The coating technology is adjusted so that insofar as possible all coatings will pass the One Diameter Wrap Test. However, under most conditions, the applied aluminum coating will meet wrap test requirements applicable to equipment thicknesses of hot-dipped zinc.

Satisfactory hot-dipped aluminum coatings may be applied to wire of various sizes so as to comply with the requirements of Class A zinc coatings specified by the American Society for Testing Materials. This comparison is made

on the basis of equivalent thicknesses of zinc and aluminum coatings rather than equivalent weights of coating by reason of the fact that aluminum is lower in specific gravity than zinc. Aluminum coatings equivalent in thickness to coatings of zinc of about 1.25 to 1.5 oz per sq ft of uncoated wire surface have been successfully applied to sizes of wire 0.135 in. and larger, the coating being characterized by satisfactory ductility and adherence.

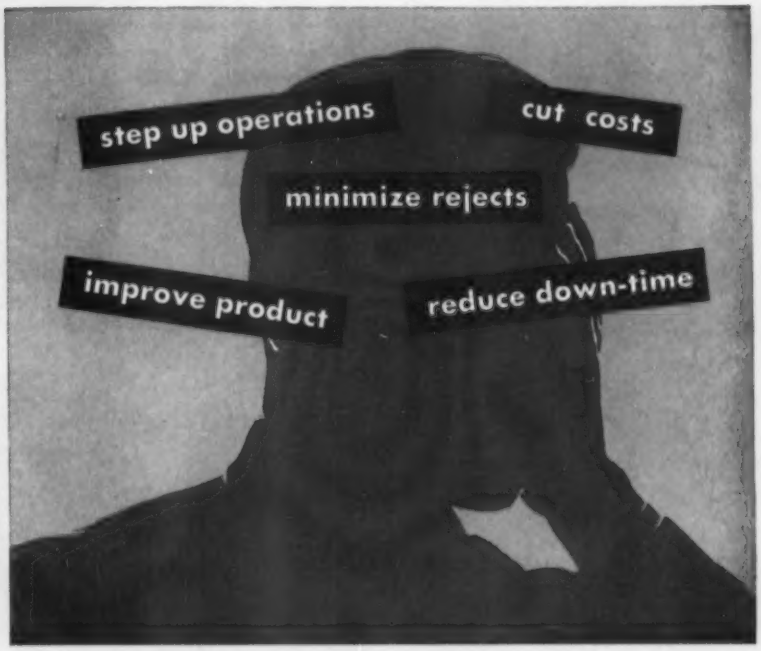
Used On Many Products

In general, the coating and properties of wire for standard galvanized products such as strand, chain link fabric, some grades of telephone and telegraph wire, most manufacturers' wires, and special products may be duplicated with aluminum-coated wire. In this connection, comparison of aluminum versus zinc coatings is made on the basis of equivalent coating thickness rather than equivalent weight.

Outdoor exposure tests in both industrial and highly humid atmospheres have not progressed to the point where the magnitude of the superiority in corrosion resistance of aluminum-coated wire compared to zinc-coated wire may be presented.

Preliminary data indicate that aluminum coatings are substantially superior to equivalent thicknesses of zinc coatings exposed in industrial and highly humid atmospheres. Salt spray corrosion data show less pronounced differences.

Aluminum coated wire . . .



take your "HEADACHES"

to a specialist . . .

WALLINGFORD STEEL

FOR QUALITY STAINLESS STRIP

We specialize in easing "headaches" brought on by the need for . . . an improved product . . . better production . . . reduced fabricating and finishing costs . . . fewer rejects . . . less down-time. We prescribe . . .

WALLINGFORD STAINLESS STRIP

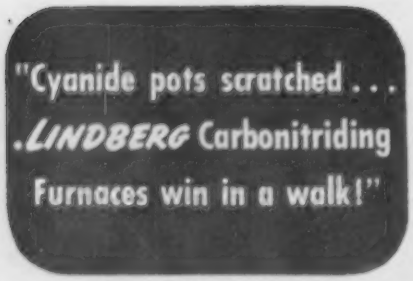
- Thinnesses to .002".
- Accuracy to ± .0001".
- Meets *rigid* specifications for size, finish, analysis, temper.
- Has smooth, straight edges.
- Gages uniformly.
- Draws easily.
- Punches cleanly.
- Special sections rolled to your exact design.

Write today. We'll meet the challenge of your most persistent product, cost and production "headaches" with a staff of specialists — engineers, metallurgists and production experts — well-qualified to administer effective treatment.

THE WALLINGFORD STEEL CO. SINCE 1922

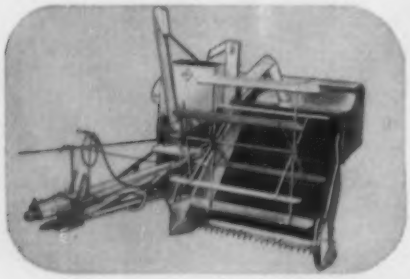
WALLINGFORD, CONN., U.S.A.

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP • STAINLESS WELDED TUBES AND PIPE

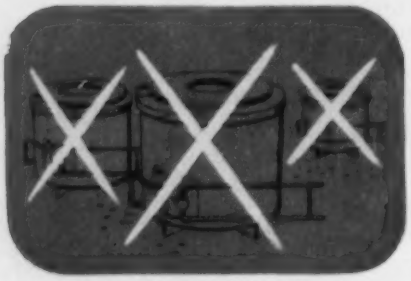


1. Owner, Allis-Chalmers, internationally known maker of farm machinery.

2. Allis-Chalmers purchased 3 Lindberg Carbonitriding Furnaces for its La Porte Works.

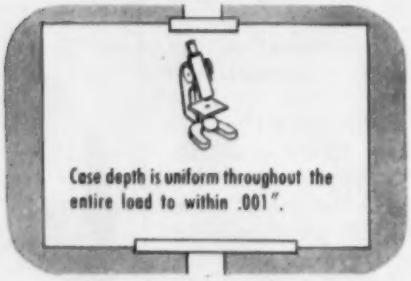


3. Furnaces used to heat-treat farm machinery parts—from a few ounces to 5 pounds.



4. Old salt pots did not provide needed volume or desired uniformity of case depth.

5. This factor represents a tangible, specific saving in operating and labor costs.



6. In addition to this advantage, working conditions were substantially improved.

7. Shot blasting eliminated... case depth requirements of .005 to .030 met.

8. Neutral hardening, carbon correction, tool treating—done with simple switch-over.

HOW ABOUT YOUR PLANT?
Perhaps we can help solve a production problem that will increase output, improve working conditions, and cut costs in your plant, too.
Write for our Bulletin No. 241.

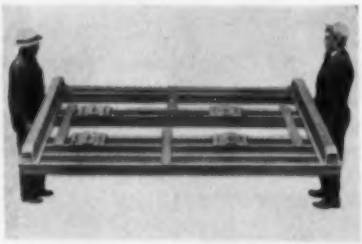
NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 101 or 102

For specialized high temperature testing

A liquid bath unit for high temperature testing combines compact design and wide operating range. The unit illustrated has 1 cu ft capacity with a temperature differential of 1°F throughout a range from ambient to +400°F. A lock arrangement prevents lid being opened when temperature exceeds safety limitations. Special silicone oil is used for the liquid bath and unit contains specially designed reservoir to hold additional volume of oil created by increased temperature. Provisions are made for returning oil to testing bath when required. The testing bath is agitated by air driven motor. A six position switch gives a selection of five heats ranging from 90 to 1500 watts. Thermal breaker strips and insulation assure minimum heat loss. *Trop-Artic Temperature Products.*

For more data circle No. 30 on postcard, p. 101.



Safety skid for shipping, storing of machinery

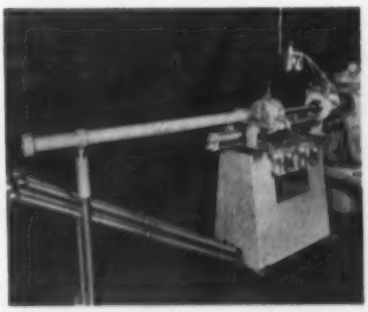
The new universal safety skid for moving heavy equipment and machinery fast and economically is made of heavy aluminum extruded members. The skid is available in 25 standard lengths which can be used as either headers or runners to assemble approximately 325 different skid sizes. Using only a wrench, it can be assembled and loaded in approximately one manhr. A completed 5x10 ft skid can be easily lifted by two men; has a load-bearing capacity of up to 80,000 lb. *Tumpane Co.*

For more data circle No. 31 on postcard, p. 101.

Automatic feed and collet unit feeds bar, tubing stock

New automatic air stock feed and collet operating unit can feed stock for any mechanism rotating or non-rotating. Designed to operate with any type of collet equipment, it consists of three main assemblies: stock tube, filler tubes and stock tube support; air operated feed chuck and feed chuck base; and a heavy-duty, high rpm rotating air cylinder. Operation of the unit is safe and quiet. Bar, hex or tubing stock up to 2⅝ in. diam can be accommodated. Feed length is adjustable from 0 to 15 in. One valve controls the entire operation. Standard stock tube lengths are 6 and 12 ft. *Erickson Tool Co.*

For more data circle No. 32 on postcard, p. 101.



Machine automatically locates and drills holes

Designed to drill holes of various diameters on a wide variety of work up to 24x48 in. or longer, the Model 24 drilling machine automatically locates and drills any number of holes to ½ in. diam in rapid sequence. Manual layout of templates, panels, chassis, printed circuits, castings, etc., is completely eliminated. Machine is equipped with an adjustable speed drilling unit which automatically drills to any desired depth. Rate of drill feed can be adjusted to meet material requirements. The operator merely sets the length and width dimensions in increments of 0.001 in. on decimal dials and presses direction controls to set the machine in motion. *Hillyer Instrument Co., Inc.*

For more data circle No. 33 on postcard, p. 101.

Turn Page

LACLEDE-CHRISTY REFRACTORIES

Laclede SUPER PLASTIC
Laclede-Christy Super Plastic Fire Brick for industrial furnaces.
Laclede-Christy cupola block, and kiln liners for cement and lime industry.
12X24X36
CA-ST 400
Laclede-Christy Cast 400—and all types of glass industry refractories.
LACLEDE SPALLAC
Laclede-Christy Spallac super duty fire brick for high temperature industrial furnaces

Name your refractory needs

What do you want? Not just the correct refractory for your purpose, but fire brick, blocks or liners that deliver *more* than you expect. You want benefits that go with this kind of service—minimum furnace down time, long furnace life and economical output. You also may want engineering service and follow-through for on-schedule performance.

You fill them best here

Laclede-Christy refractories—for the purpose you name—meet your most rigid requirements. "Quality first" is supsupported by many, many record performances. Laclede-Christy service is quick and helpful. The extra engineering help you may need is here too—at

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LACLEDE-CHRISTY COMPANY Quality First

Inaugurating a new era of service to the industrial heating industry

Tractor cab

Tractor operators are provided with maximum comfort with the new all-weather, low-cost cab designed for the Mercury Banty Model A-460 gasoline tractor. The all-steel 12 gage body can be supplied to cus-

tomers for mounting on their own tractors. Half-doors and canvas roll-down curtains completely enclose the cab. A hot-water heater keeps the operator warm. Defroster and windshield wiper are other attachments. *Mercury Mfg. Co.*

For more data circle No. 34 on postcard, p. 101.

Increased storage

Up to 25 pct greater storage capacity is given to Quick Serve sectional stock racks by new, simple base brackets. Slipped over the base flanges of Brown stock racks and secured by a single bolt through each, the base brackets provide ad-

ditional stock-supporting arms 10 in. off the floor, where they carry the heaviest materials conveniently. Since the stress is borne almost directly by the floor, the pay load carried by the complete rack is increased by supplementing the upper post arms. *Brown Engineering Co.*

For more data circle No. 35 on postcard, p. 101.

Attachment for automatic end dumping of skid boxes

A hydraulically powered attachment for automatic end dumping of skid boxes can be used with both electric and gas powered trucks with capacities of 4000, 6000 and 10,000 lb and larger. It is used especially for movement of scrap, castings, forgings and other materials in skid boxes or racks and permits dumping these materials into below-floor bins or onto the floor of freight cars or street trucks. Loading and dumping operations are automatic. *Elwell-Parker Electric Co.*

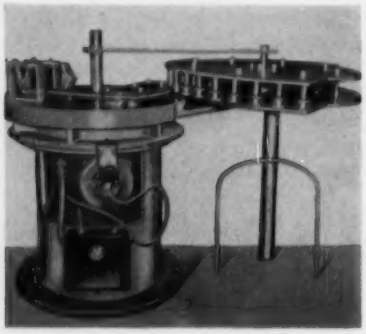
For more data circle No. 36 on postcard, p. 101.

High performance shaker for vibration-testing

Assemblies and components can be vibration tested with a new electrodynamic shaker system. The "68" system is capable of developing 100 lb peak force output over the 40 to 3000 cps frequency range, and displacement amplitudes in excess of 0.4 in. peak-to-peak in the 5 to 40 cps range. In the design of the shaker, armature weight has been reduced to a minimum to increase the useful portion of the total force output. Controls, indicators, and power for operation are all contained in a single unit, housed in a standard relay rack cabinet. *Calidyne Co.*

For more data circle No. 37 on postcard, p. 101.

Profile bender operates without an air cylinder



Action of a new production profile bender is a combination of a die type bender and roll bender and an adjustable cam wipes the piece into the die at the correct distance from the point of bend. The machine will form simple or compound bends. Almost any size can be produced up to about 6 ft square. Shapes and bar stock may be handled to any reasonable radius. The machine is suited to bend frames comprising four right angles with straight sections between, where all of the bends are made in one operation. Speed of operation is approximately one revolution in 20 sec and rate of production can be six pieces per min depending on ability of operator to handle the stock. *Pedrick Tool & Machine Co.*

For more data circle No. 38 on postcard, p. 101.

Metallized tapes have polished-silver appearance

Two pressure-sensitive film tapes, each possessing unusual strength although only 2 mils thick, can be used for widespread industrial marking, labeling and decorating. The tapes, Scotch brand polyester film tapes Nos. 850 and 852, have similar physical characteristics and metallic (silver) appearances. The polished-silver appearance is achieved by vapor-depositing aluminum between the tapes' adhesive and backing. No. 852 type is printable and is supplied with a special polyethylene-coated paper liner. Both possess excellent heat and chemical resistance. Other properties include 25 lb tensile strength per inch of tape width, 100 pct elongation, and 40 oz of adhesion per inch of width. The tape is ¼ to 23 in. wide on 72 yd rolls. *Minnesota Mining & Mfg. Co.*

For more data circle No. 39 on postcard, p. 101.

Wheel brake permits safe operation on grades

For operations where a hydraulic pallet truck must be used on grades, this lightweight truck has a safety brake which operates on the front wheels of the truck, not on the floor. Brake consists of a lined shoe on the front wheels operated through the position of the pull handle. To apply the brake on grades the operator lowers the handle. Weighing only 250 lb, the truck will carry 2000 lb loads with a minimum of dead weight. *Lewis-Shepard Products, Inc.*

For more data circle No. 40 on postcard, p. 101.

Turn Page

Everyone recognizes this as a sign of strength...

And smart gear users know this CINTI is the sign of the best in custom made gears.

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CINTI®

"Gears...Good Gears Only"

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PNEUMATIC TOOL EXTRAS!

New "NR" grades of NON-FLUID OILS, made specifically for all Pneumatic Tools and used and approved by most leading manufacturers of air tools—give these LUBRICATION EXTRAS:

PLUS #1. Complete rust-proofing even during indefinite down-time.

PLUS #2. Eliminates gumming and sticking of all moving parts, including fibre blades of rotary tools.

PLUS #3. Higher lubricity with anti-wear agent reduces friction and increases speeds up to 30%.

PLUS #4. Higher tool speeds mean more production of work in same number of hours used.

PLUS #5. Over-all tool maintenance costs are reduced more than 50%.

PLUS #6. Winter grade available with pour point of —30°F.

To test is to prove. Send now for Bulletin 550 and free testing sample of "NR" grade NON-FLUID OIL.

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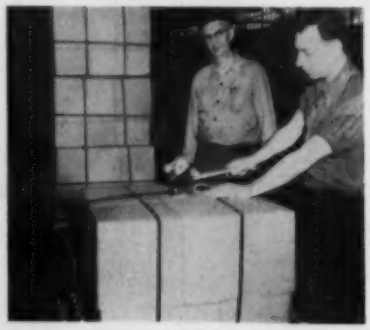
NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

Adjustable container

Adjusta-Pak method of packing utilizes 8 modular units of slotted and scored fiberboard sheets, which, when assembled act as an outer pack to smaller packages. Four corner pieces are formed into an open container and the packages



deposited inside. Four additional corners are formed and placed on top, telescoping over the bottom sections, adjusting to the pack. The entire unit is unitized with three or more bands of tensional steel strapping. *Signode Steel Strapping Co.*

For more data circle No. 41 on postcard, p. 101.

Gages bearing balls

A Swiss machine automatically gages and classifies rollers and balls for bearings in diameter groups with increments of 0.00002 in. with a maximum possible error

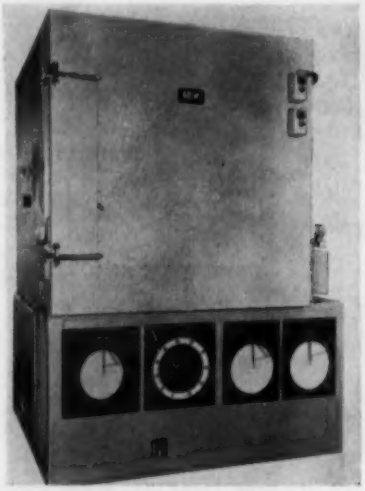
of 1/10 micron (0.000004 in.). The Censor classifier is fully automatic. Cylindrical pieces such as rollers, balls and needles are fed at random into a hopper. A simple feeding mechanism eliminates need for attendance. Over and undersize

pieces are kicked out separately. All others are within tolerances; are classified in up to 7 matched groups of the fineness indicated above. The machine is rated at 4000 to 7000 pieces per hr. *Carl Hirschmann Co., Inc.*

For more data circle No. 42 on postcard, p. 101.

High altitude conditions

Simulation of high altitude conditions are possible in this test chamber that utilizes radiant heating and cooling from the five walls and the door in addition to the normal method of heating the air. Radiant heating and cooling is provided at



all altitudes up to 130,000 ft, with operating range from low temperatures to +500°F. The chamber has a 24 cu ft work space; can reproduce humidity of 5 pct or less within range of 160° to 200°F. Temperature may be changed in either direction at the rate of 10° per min. *American Research Corp.*

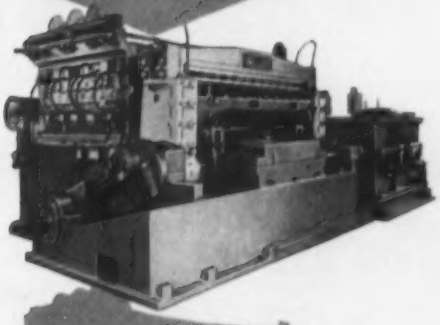
For more data circle No. 43 on postcard, p. 101.

Low-hydrogen electrode

For high speed welding, a new type low-hydrogen electrode has stability and ease of handling. It offers 50 pct faster speed in application, and features improved striking and restriking characteristics. Bead appearance and slag removal are superior to older types. Inexperienced operators quickly master the DH-170 and obtain top-quality welds. Sizes range from 3/32 through ¼ in. *Harnischfeger Corp.*

For more data circle No. 44 on postcard, p. 101.

Turn Page

AUTOMATIC SHEARS
by HALLDEN
flexible design
cutting accuracy
continuous feed
rugged construction

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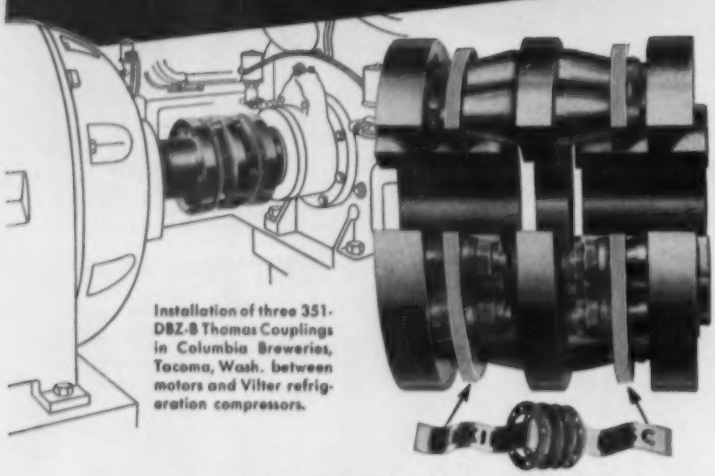
(Ferrous & Non-Ferrous)

For grinding, reconditioning small tools and cutters

The new No. 1 cutter and tool grinder with capacity of 8 in. swing and 15 in. between centers has cartridge type grinding wheel spindle mounting with a double row of special preloaded anti-friction bearings, packed in grease for life-time lubrication. This cartridge type unit may be replaced after years of service, restoring new spindle performance into the machine in an interval of minutes. A 360° eccentric wheelhead swivel provides greater flexibility. Reversible motor drive built in to wheelhead reduces changeover time from grinding one type of cutter to another. Anti-friction table slide provides unusual ease of table movement. Spindle speeds, 6260 or 3730 rpm, are easily obtainable from a tooth grip drive belt and sheave arrangement. *Cincinnati Milling Machine Co.*

For more data circle No. 45 on postcard, p. 101.

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

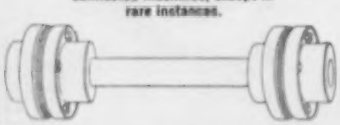


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

Piston pin gage

Completely automatic, multiple action electronic sorting gage measures hardness, overall length, triangular out-of-round, outside diameter and taper of automotive piston pins and sorts them into 10 categories, including four OD groupings of 0.0001 in. each plus oversize and undersize. Its gaging

and sorting speed is 4000 plus workpieces per hr. The gage is designed for conveyor or manual feed and disposal. Electrical operation of the five gaging stations and all recycling is controlled automatically by switches actuated by timing cams. *Federal Products Corp.*

For more data circle No. 46 on postcard, p. 101.

Fast drying of molds

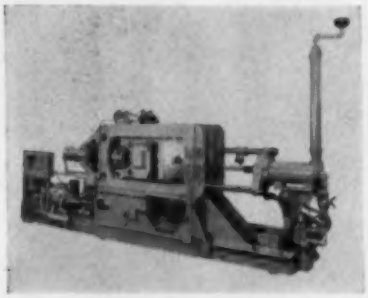
Three fast-drying sprays help speed up drying of green sand foundry molds. All three can be mixed with conventional mold coating to give a spray coating that permits much faster drying than water-mixed coatings. Stevens Quik-Dry is suited for flame igniting to speed drying; Speedri permits speeded-up drying through use of a torch. Ignisol fast-drying spray can be ignited, and can also be used in cases where fast air drying is desired. *Frederic B. Stevens, Inc.*

For more data circle No. 47 on postcard, p. 101.

NEW EQUIPMENT

Aluminum diecaster

A 600-ton aluminum diecasting machine incorporates the pre-fill injection system. It will cast up to 16 lb aluminum or proportionate weights of magnesium or brass, and is convertible to zinc diecasting. Both increased production and versatility are advantages of the diecaster. In the shop assembly the

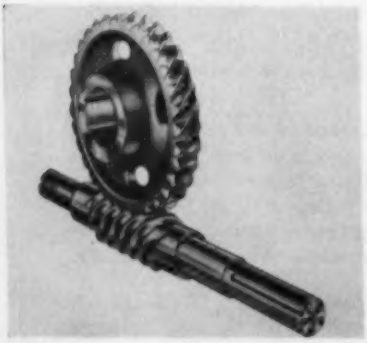


machine provides 33,200 psi maximum pressure on metal. Both shot speed and pressure are adjustable, with an ASME approved nitrogen accumulator giving high speed injection. Angled support bars of the injection system simplify metal pouring. Shot position allows 6 in. adjustment. Die opening is 14 in. Movable platen is 40 in. wide with vertical clearance between beams of 28¼ in. *Lester-Phoenix, Inc.*

For more data circle No. 48 on postcard, p. 101.

Worm gear sets

New standard worm gear sets are offered for applications in cranes and hoists, machine tools, furnace drives and metal mills, and other



equipment with shock load or uniform load characteristics. The worm gear sets are available in standard ratios from 4⅛ to 71. *Foote Bros. Gear & Machine Corp.*

For more data circle No. 49 on postcard, p. 101.

Got a Perforating Problem?
See Hendrick for the Solution!

Sometimes the quickest, surest answer to design problems is very simple. In numerous cases, the inclusion of a pleasing pattern of perforations is just what is needed to make products more attractive and saleable. And whatever material you're using—be it metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes, Hendrick can help you.

For many years Hendrick has been building up the largest stock of dies commercially available. If you are faced with the need for bringing newer, more modern design elements into your products, Hendrick's long experience and perforating facilities can be yours for the asking. Write for more information, today.

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COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

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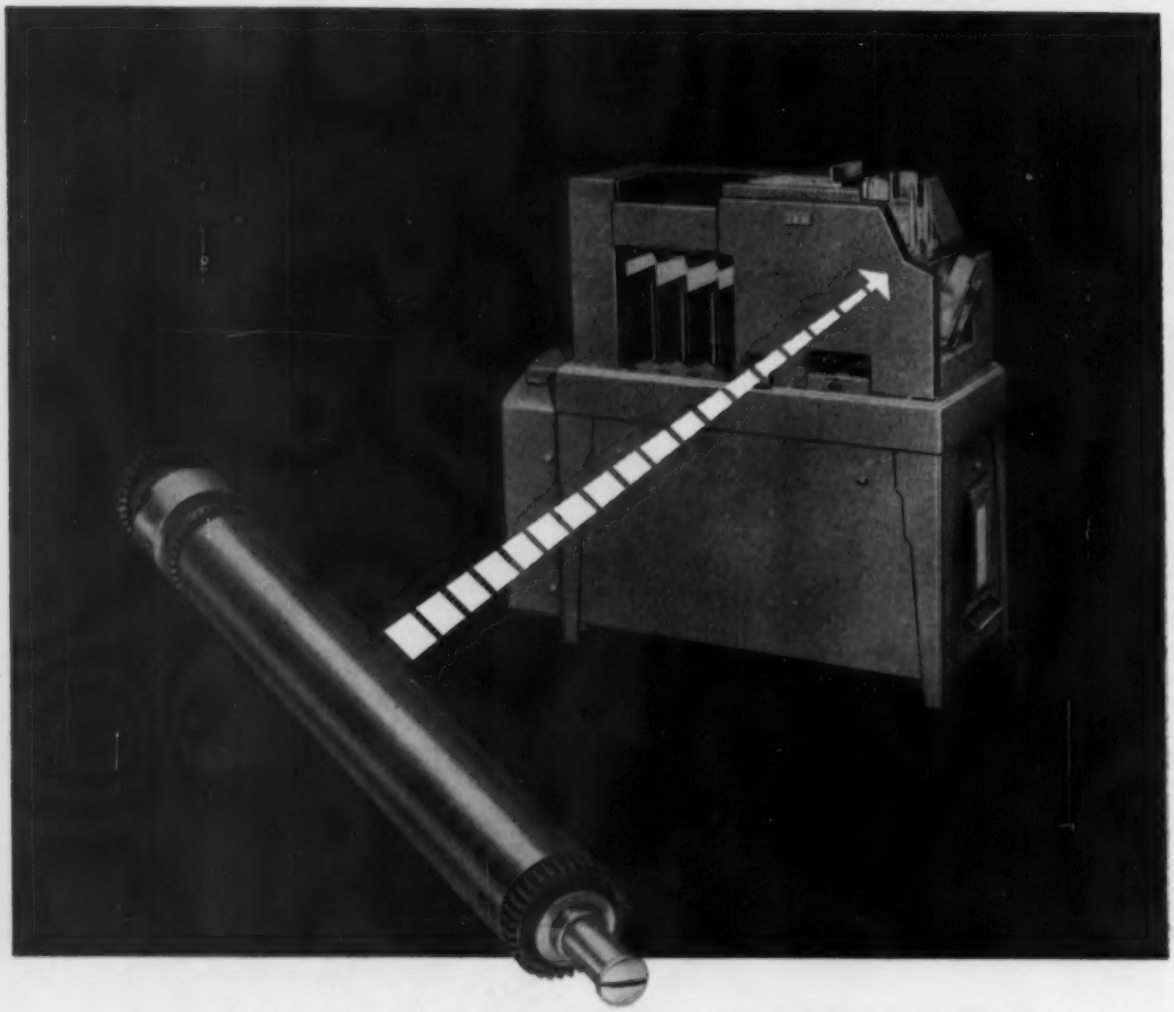

Out of IBM's Collator pops a tubing idea for you!

This is IBM's Collator—a mechanical super-accountant that shuffles, selects, matches and merges punched cards at the rate of four per second!

Heart of this electronic gee-whizzer is an extraordinary kind of tubing—a contact roll over which the cards must pass. Eighty miniature, hard steel brushes finger each card as it skims by—penetrate it through pre-punched holes, touch the contact roll and close the electronic circuit—flipping the card into the right slot.

Collator contact rolls must have good wear resistance to stand this high-speed workout. And they must resist corrosion and be good electrical conductors. So IBM employs Superior WELDRAWN® Beryllium Copper and low carbon steel composite tubing for Collator contact rolls. This tubing meets IBM's tight specifications for wear resistance, peak hardness and conductivity. Superior supplies the composite tube in 1⅛" O.D. with .049" wall.

When tubing troubles put the hex on your plans, call on Superior.

We have years of experience, the modern test and development facilities, and more than 55 analyses in many metals to unravel your problem. Write for a copy of our new Technical Bulletin #7-2 on Seamless and WELDRAWN® Beryllium Copper Tubing. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

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THE BIG NAME IN SMALL TUBING

All analyses .010" to ⅝" O.D.
Certain analyses in light walls up to 2½" O.D.

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STEEL OUTLOOK

Markets and Prices

The Iron Age SUMMARY...

Steel users find it difficult to build stocks . . . Producers getting set for bulge in demand in March . . . Scrap is up.

All Products Tighter . . . The tightest steel market since September 1953 hit the steel industry this week. In 1953 the trend was downward—this week it was strongly upward. Extended deliveries now have spread to most steel products with some producers already setting up third quarter flatrolled steel rolling schedules.

The volume of new steel business exceeds capacity with many steel firms this week. And there was no sign of hesitation in the strong flow of bookings. This is the picture before a seasonal bulge in steel orders reaches mills in March—usually a peak month.

Product Managers Compete . . . Steel product managers within steel companies are competing with each other for available steel and scheduling becomes more difficult each week. As the ingot rate moves toward capacity operations the situation will become acute.

Most steel plants are taxed by current recovery business but additional seasonal orders are expected to reach mills soon from farm implement makers, construction projects, canmakers, railroads, oil and gas companies and stampers. This upsurge may lift the ingot rate to 95 pct or higher.

A few months ago market emphasis was mostly on cold rolled sheets. A month ago the stress was on cold rolled sheets, enameling sheets, galvanized sheets and terneplate. In recent weeks demand for those items has expanded but along with that has come much heavier demand for plates, bars, semi-finished (for export), oil country goods, farm products, and linepipe.

Long Term Outlook . . . Those who had looked for a significant letdown in the third quarter are now changing their sights. Less steel will be bought by automakers then but the changeover period will be shorter because model changes will not be extensive. Export demand will be heavy this summer and mill backlogs will be somewhat larger than at present. Another cushion for steel will come from general industrial recovery and expansion.

Heavy demand from Britain, West Germany and other nations for American scrap is worrying government officials and domestic steel people. Both fear a runaway scrap market. While some additional restrictions may be put on scrap exports by the Commerce Department the brakes can't be too tight in view of State and Defense Department commitments to our allies. The final arguments will rest with State and Commerce rather than with industry.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,153	2,150	2,051	1,756
Ingot Index (1947—49=100)	134.0	133.8	127.7	109.3
Operating Rates				
Chicago	91.0	91.0	87.5	80.0
Pittsburgh	91.0	90.0*	82.0	85.0
Philadelphia	84.0	84.0	76.0	72.0
Valley	89.0	88.0	85.0	71.0
West	90.0	88.0*	90.0	77.5
Detroit	93.0	92.0	91.0	67.0
Buffalo	100.0	100.0	100.0	68.5
Cleveland	94.5	92.5	83.0	70.0
Birmingham	86.5	85.5	74.0	80.0
S. Ohio River	87.5	70.0	95.5	79.0
Wheeling	96.0	98.0*	100.0	76.0
St. Louis	102.0	103.0	87.5	45.5
Northeast	97.5	97.5	45.0	73.0
Aggregate	90.0	88.5	85.0	73.5

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	$56.59	$56.59	$56.59	$56.59
Scrap, No. 1 hvy (gross ton)	$37.00	$36.33	$35.50	$24.33
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	33.00	33.00	30.00	29.75
Lead St. Louis	14.80	14.80	14.80	12.30
Magnesium, ingot	27.75	27.75	27.75	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	90.50	90.125	88.50	85.00
Zinc, E. St. Louis	11.50	11.50	11.50	9.25

Short-Term Gray Market Here

Automotive, appliance buyers pay $5 to $10 per ton for emergency tonnage . . . Brokers, dealers stock up on seconds, rejects . . . Only small tonnage involved thus far.

• THOSE who deny existence of a gray market in certain steel products are closing their eyes to the fact that some consumers are being forced to pay above-mill premium prices to tide them over tight spots pending delivery from their regular suppliers.

Automotive parts suppliers, appliance manufacturers, and other consumers have paid $5 to $10 per ton over mill price for emergency tonnages of hot and cold-rolled sheets and, when they could find them, enameling sheets. In one specific instance, a consumer of hot-rolled sheets paid $5 below warehouse price for 75 tons he needed urgently.

These deals, while involving only small tonnages to date, have been made with brokers and others who can operate on a premium basis only when the market tightens up to the point where it is today.

The fact that prices paid to date have been below warehouse price is no comfort to the consumer who normally buys from a mill but who is forced to pay a premium to brokers because of extended mill deliveries.

THE IRON AGE was one of the first to uncover and publicize existence of a gray market following World War II and during Korea. What we have now bears no resemblance to those markets but the potential is there, at least on a short-term basis.

Meanwhile, reports to IRON AGE editors indicate that brokers and dealers are stocking up with seconds and rejects — even material that normally is scrapped—on the assumption that the market will become even tighter and enable them to command higher premiums from desperate consumers.

Steel users themselves are partly to blame for the situation. Many of them let their inventories drop below safety levels and were caught short due to a pickup in their own business plus improved demand from heavy consumers, such as automotive.

A tight market in wide-flange beams has enabled Phoenix Iron and Steel to increase its selling price to 4.30¢ per lb., the same level charged by other producers. This producer had been selling under the market when demand was low. His price on standard structurals remains at 3.95¢ per lb., $7 per ton below competitors.

Effective Feb. 10, Superior Steel Corp. raised the price of hot and cold rolled copper clad strip. New prices are: Hot rolled, 10 pct one side, $25.75 per 100 lb.; 10 pct two sides $33.55 per 100 lb. Cold-rolled, 10 pct one side, $29.60; 10 pct two sides $37.15.

SHEET AND STRIP . . . Cold-rolled sheets look solid for the first half. And some producers are beginning to wonder whether their predictions of a softening in second half will materialize. Some mills in **Cleveland** area are setting up rolling schedules for third quarter, and one producer is accepting hedge orders for July. In some producing centers, hot-rolled is beginning to catch up with cold-rolled.

BARS . . . Hot and cold-rolled carbon bars are strong, particularly in small sizes. Evidently, consumers have used up previously heavy inventories and are now ordering for consumption. Cold-finished bars are lagging behind hot-rolled, but there has been a definite improvement. Market continues to improve in **Chicago** despite rumors that farm equipment production is due for a slowdown. Reinforcing bar holding up well on **West Coast** due to an upswing in general construction work. Both carbon and alloy are stronger in the **East**.

STRUCTURALS . . . Wide-flange beam market is particularly strong as construction and road building orders hit the mills. Heavy standards appear to be lagging but light standards are gaining strength. In **Chicago** one mill sold out on current cycle and looks for demand to increase; bar angles also in good shape. **West Coast** market is dragging at the moment but mills look for a pickup in the spring. In the **East**, heavy inquiries foreshadow the anticipated spring pickup.

PIPE AND TUBING . . . Another busy year in the oil fields plus steadily increasing demand for linepipe. Mills are stepping up production to meet demand. Gadsden mill of Republic Steel resumed operations Feb. 21 on an order for 30,000 tons of 30-in. linepipe, ending a 2½-month layoff. Buttweld demand is good. Mechanical and pressure tubing improving.

WIRE . . . Some wire mills are operating at near-capacity levels as the combination of strong demand for manufacturers and merchant wire makes itself felt. And the peak is still to come. Construction products are entering the picture in a strong way.

WAREHOUSE . . . **Chicago** distributors report a day-by-day improvement in February over January business; specialty warehouses are particularly strong. In **Cleveland**, the pickup is spotty; some price cutting reported on prime sheets; secondaries are firming up; coil ends from automotive stampers are finding their way into secondary sheet houses at slightly over scrap value. **West Coast** business improved slightly.

Purchasing Agent's Checklist

MACHINE TOOLS: Outlook is solid for this year ..... p. 39
TINPLATE: Consider boosting electrolytic capacity ..... p. 46
STEEL: British production hits new high ..... p. 48
PLASTICS: Reinforced pipe shows fast growth ..... p. 64

Comparison of Prices

(Effective Feb. 22, 1955)

Steel prices on this page are the average of various f.o.b. quotations at major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Feb. 22 1955	Feb. 15 1955	Jan. 25 1955	Feb. 23 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.513
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails, (per 100 lb.)				
Heavy rails	$4.45	$4.45	$4.45	$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$64.00	$64.00	$64.00	$62.00
Slabs, rerolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

	Feb. 22 1955	Feb. 15 1955	Jan. 25 1955	Feb. 23 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$38.50	$38.50	$36.50	$24.50
No. 1 steel, Phila. area	39.00	37.00	35.50	23.50
No. 1 steel, Chicago	33.50	33.50	34.50	25.00
No. 1 bundles, Detroit	29.00	29.00	27.50	19.00
Low phos., Youngstown	36.50	36.50	36.50	27.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	41.50
No. 1 mach'y cast, Philadel'a.	43.50	43.50	43.50	39.00
No. 1 mach'y cast, Chicago	45.00	45.00	45.00	34.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$37.00	$36.33	$35.50	$24.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	30.00	29.75‡
Copper, Lake, Conn.	33.00	33.00	30.00	30.00
Tin, Straits, New York	90.50†	90.125	88.50	85.00
Zinc, East St. Louis	11.50	11.50	11.50	9.25
Lead, St. Louis	14.80	14.80	14.80	12.50
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	68.08
Magnesium, ingot	27.75	27.75	27.75	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. • Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 132→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	$8.00	$8.50	$9.00	$9.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *U4*	52.38	52.88	$6.50	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *I11*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	.....	61.00	61.50	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.00	58.40	58.00	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	56.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
So. Chicago *R3*	56.00	.....	56.50	.....	.....
Steelton *B3*	56.00	56.50	59.00	59.50	64.00
Swedeland *A2*	56.00	56.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	56.00	56.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $66.25; Jackson, *J1, G1*, $65.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 9-75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	301	302	303	304	316	321	347 Cb	410	416	430
Ingots, rerolling	16.75	17.75	19.25	19.00	29.75	23.50	25.50	14.00	—	14.25
Slabs, billets, rerolling	21.00	23.25	25.25	24.50	38.00	30.25	46.75	18.25	—	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	31.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	40.50	60.50	46.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.7
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.0
Strip, cold-rolled	36.75	42.00	46.00	44.50	64.50-64.75	51.25-51.50	77.50	34.25	41.25	34.71

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W3, J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4* Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler (Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Readlng, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D5*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15* Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J3*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

IRON AND STEEL SCRAP MARKETS

Strong Market Moves Upward

Heavy purchases in Philadelphia strengthen Eastern market . . . Prices moved upward in Birmingham . . . Chicago steady . . . Composite Price moves up 67¢ to $37.00.

◆ HEAVY PURCHASES by an Eastern mill on top of an already strong market served a dual purpose of increasing the price of No. 1 heavy melting steel by $2 in the Philadelphia district and attracting openhearth scrap from Pittsburgh and other Midwest channels of supply.

Sources in Pittsburgh report that this Eastern competition isn't making it easier for mills in that area to obtain "out-of-district" scrap at going prices.

Prices of openhearth grades remained unchanged in Chicago but market remains strong. Top prices on electric furnace grades slipped off slightly as mill buyers stiffened specifications.

Reflecting the price increase in the Philadelphia market THE IRON AGE Heavy Melting Steel Scrap Composite rose 67¢ to $37.00 per gross ton.

Pittsburgh . . . The market continues strong following a sizable purchase by a large consumer last week. The purchase, consisting of No. 1 and No. 2 heavy melting and No. 2 bundles, was made at 50¢ and $1 below current prices. Additional freight accounted for the price differential. There has been no new business this week, but strong eastern competition isn't making it any easier to obtain "out-of-district" scrap. The price of No. 1 and No. 2 heavy melting remains the same to reflect the overall picture. No. 2 bundles are down 50¢ to $30.50. Blast furnace grades remain strong and may move higher. They are becoming increasingly difficult to bring into the area at current prices.

Chicago . . . Though cast scrap continued strong in the Chicago market, brokers and dealers were generally not hopeful for prospects in other grades. Recent rejections as well as still slipping electric furnace and railroad prices, reinforced by the small tonnage placed in new mill orders, had the effect of putting more slack into a market that was already slow. Blast furnace grades were again confirmed at previous prices by a fresh sale, giving strength to a grade that had been one of the first to slip. In addition to pinching the top price on electric furnace grades a little harder, mill buyers in the past week stiffened specifications on the grade. With the memory of waves of bundles rejections in the past three weeks, suppliers of the grade are again worried.

Philadelphia . . . Heavy purchases of openhearth grades moved prices up $2. Low phos grades moved up in sympathy although large tonnage sales were not reported at press time. Increased strength in turnings was borne out in a $1 increase in that grade. Cast grades were reported strong but held steady at current prices.

New York . . . Openhearth grades reflected heavy mill buying in the Philadelphia area. No. 1 heavy melting steel climbed to a top price of $34 as export buying responded to the increase. Cast grades remained strong with prices unchanged.

Detroit . . . Hold-ups on both blast furnace and openhearth grades at local mills would have a depressing effect on the market if it were not for contrasting strength from outside. Prices remained steady except for some minor fluctuations in No. 2 grades. Most of the trade expected that automotive lists closing this week would be up about $1 from last month, but that might be wishful thinking.

Cleveland . . . No. 2 heavy melting went up $2 a ton and No. 2 bundles 50¢ in the Valley last week on basis of a major purchase by a large steel producer in the area. The buy was unexpected in the midst of what had been a quiet market in the area. The spread between No. 1 and 2 heavy melting was narrowed to only $2 while the top grade remains firm but unchanging. Several mills in the Valley and Cleveland have announced no additional buys are planned for several weeks with the exception of blast furnace material.

Birmingham . . . The scrap market reacted to export prices this week when Southern mills advanced prices on most grades as much as $3 per ton. Exports have been draining scrap from the district, but dealers believe the increased prices they will be able to pay will bring in more scrap.

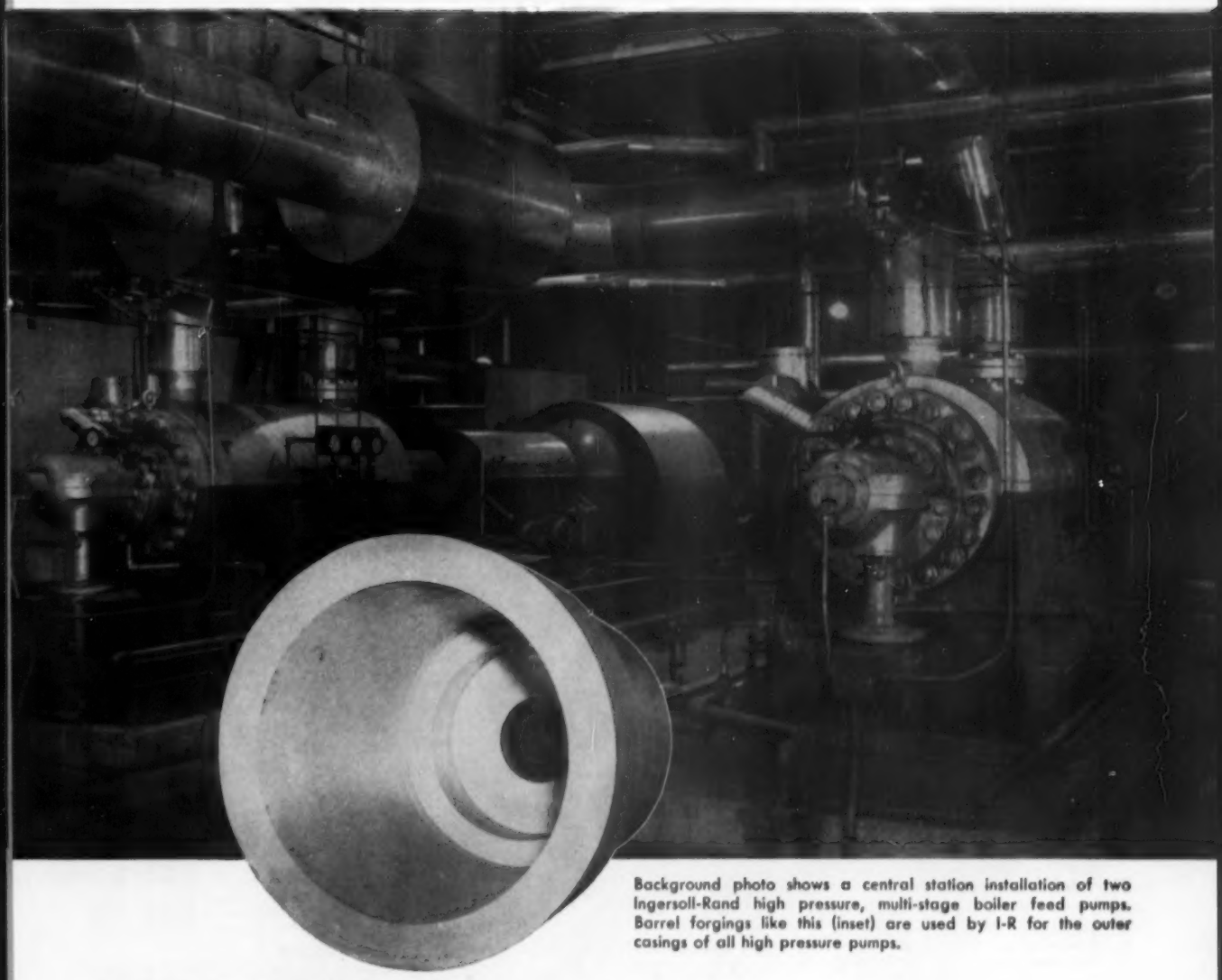
St. Louis . . . A railroad list closing Monday of 128 cars brought higher prices for some items, including $1 to $2 more for railroad No. 1 heavy melting, random length rail, locomotive tires uncut, angles and splice bars, and axles, and $1.50 for short rail of 18 in. and under. A Texas mill readjusted its prices upward as follows: No. 2 steel, freight $4 and under, $34.50; freight $4 to $6, $31.50; and freight $6 or more, $32. This strengthens the Southwest market but can affect the local situation only if the mills here need to go that far for material.

Cincinnati . . . Market continued in mid-month doldrums with most market interest centering on possibility of shipments to Pittsburgh. Mills there are attracted by favorable price but costs and complexity of barge-rail deliveries are deterrents.

Buffalo . . . Strength in the local market—with unchanged prices—reflects buying by mills in other districts in sections which usually ship here. Pittsburgh, Valley and Eastern Pennsylvania consumers have been draining the mid-state area. Dealers here are still shipping on old orders but one of the top mills remains out of the market.

Boston . . . New England market has firmed up further with activity at least on a fair level. Export is still going but there is some feeling by certain members of the trade that this will taper off.

West Coast . . . Scrap market in a fluid state. San Francisco prices for top grades are up $2-$4 from last week. In Los Angeles, some mills are reported to be buying at $2 above last week.



Background photo shows a central station installation of two Ingersoll-Rand high pressure, multi-stage boiler feed pumps. Barrel forgings like this (inset) are used by I-R for the outer casings of all high pressure pumps.

Ingersoll-Rand tells how:

STEEL FORGINGS HELP GIVE LONG LIFE TO HIGH PRESSURE BOILER FEED PUMPS

Ingersoll-Rand Class CHTA boiler feed pumps are widely used in high pressure central power generating stations throughout the world. They are double-case units, the inner assembly containing the rotor and fluid passages and the outer casing providing the pressure vessel to enclose this pumping unit.

For service under high pressures and temperatures, Ingersoll-Rand uses steel forgings for the outer casing of these boiler feed pumps. Since Standard Steel forges these outer barrels from solid billets of high carbon steel, they have a close grained, homogeneous structure. That's a big reason why Ingersoll-Rand double-case pumps have established a reputation for long, trouble-free service with sustained high efficiency.

Very likely, you can improve *your* products by using Standard Steel barrel forgings, rolled rings, flanges or other forgings. Our engineering and metallurgical departments have helped solve many diverse problems. Please write us about yours.

Standard Steel Works Division
Burnham (Mifflin County), Pa.
BALDWIN-LIMA-HAMILTON
General Offices: Philadelphia 42, Pa. Offices in Principal Cities

Scrap Prices *(Effective Feb. 22, 1955)*

Pittsburgh

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	29.50 to 30.50
Machine shop turn.	20.50 to 21.50
Mixed bor. and ma. turns.	20.50 to 21.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. punch'gs, plate	41.00 to 42.00
Heavy turnings	35.00 to 36.00
No. 1 RR. hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	44.00 to 45.00
RR. spring steel	44.00 to 45.00
RR. couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast	38.00 to 39.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 factory bundles	35.00 to 36.00
No. 1 dealers' bundles	33.00 to 34.00
No. 2 dealers' bundles	34.00 to 35.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	38.00 to 39.00
Low phos. punch'gs, plate	36.00 to 37.00
Low phos. 3 ft and under	35.00 to 36.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	39.00 to 40.00
Rerolling rails	49.00 to 50.00
Rails 2 ft and under	47.00 to 48.00
Locomotive tires, cut	36.00 to 37.00
Cut bolsters & side frames	37.00 to 38.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	41.00 to 42.00
RR. couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	44.00 to 46.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	33.00 to 34.00
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	35.00 to 36.00
Malleable	43.00 to 45.00
Stove plate	34.00 to 35.00

Philadelphia Area

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	38.50 to 39.50
No. 2 bundles	30.50 to 31.50
Machine shop turn.	21.50 to 22.50
Mixed bor. short turn.	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	23.50 to 24.50
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	40.00 to 41.00
Low phos. 2 ft and under	42.00 to 43.00
Low phos. punch'gs	42.00 to 43.00
Elec. furnace bundles	40.00 to 41.00
Heavy turnings	37.00 to 38.00
RR. steel wheels	41.00 to 42.00
RR. spring steel	41.00 to 42.00
Rails 18 in. and under	51.00 to 52.00
Cupola cast	36.00 to 38.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	44.00 to 45.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	44.00 to 45.00
Charging box cast.	35.00 to 36.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	33.50 to 34.50
No. 2 bundles	27.00 to 28.00
No. 1 busheling	33.50 to 34.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Cut struct'r'l & plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	33.50 to 34.50
Low phos. punch'gs, plate	33.50 to 34.50
Foundry steel, 2 ft & under	37.00 to 38.00
No. 1 RR. heavy melting	34.00 to 35.00
Rails 2 ft and under	47.00 to 48.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	37.00 to 38.00
Steel axle turnings	37.00 to 38.00
Railroad cast.	.... 45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	39.00 to 40.00
Malleable	.... 44.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. plate	36.00 to 37.00

Buffalo

No. 1 hvy. melting	$31.50 to $32.50
No. 2 hvy. melting	27.50 to 28.50
No. 1 busheling	31.50 to 32.50
No. 1 bundles	31.50 to 32.50
No. 2 bundles	25.50 to 26.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Low phos. plate	33.50 to 34.50
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$28.50 to $29.50
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles, openhearth	28.50 to 29.50
No. 2 bundles	21.00 to 22.00
New busheling	27.00 to 28.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. punch'gs, plate	28.50 to 29.50
No. 1 cupola cast.	.... 34.00
Heavy breakable cast.	.... 25.00
Stove plate	.... 30.00
Automotive cast.	.... 38.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	15.50 to 16.50
Cast. iron borings	15.50 to 16.50
Shoveling turnings	17.00 to 18.00
No. 1 RR. hvy. melting	35.00 to 36.00
Rails, random lengths	40.00 to 41.00
Rails, 18 in. and under	47.00 to 48.00
Locomotive, tires uncut	35.50 to 36.50
Angles and splice bars	35.50 to 36.50
Std. steel car axles	35.50 to 36.50
RR. spring steel	37.00 to 38.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	33.00 to 34.00
Cast iron brake shoes	29.00 to 30.00
Stove plate	34.00 to 35.00
Cast iron car wheels	34.50 to 35.50
Malleable	35.00 to 36.00
Unstripped motor blocks	32.50 to 33.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	27.00 to 28.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	27.00 to 28.00
Elec. furnace, 3 ft & under	28.00 to 29.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and short turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	27.00 to 28.00
Heavy breakable cast.	26.00 to 27.00
Stove plate	25.00 to 26.00
Unstripped motor blocks	18.00 to 19.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Clean cast chem. borings	22.00 to 23.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	28.00 to 29.00
Unstripped motor blocks	32.00 to 33.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	26.00 to 27.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	35.50 to 36.50
Structural and plate, 2 ft.	35.50 to 36.50
No. 1 RR. hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	38.00 to 39.00
Rails, 18 in. and under	42.00 to 43.00
Angles & splice bars	39.00 to 40.00
Rerolling rails	43.00 to 44.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	32.00 to 33.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.50 to 36.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos., 18 in. & under	36.00 to 37.00
Rails, random lengths	40.00 to 41.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$26.00 to $28.00
No. 2 hvy. melting	23.00 to 25.00
No. 1 bundles	24.00 to 26.00
No. 2 bundles	20.00 to 22.00
No. 3 bundles	16.00 to 18.00
Machine shop turn.	.... 6.00
Cast iron borings	.... 9.00
No. 1 RR. hvy. melting	26.00 to 28.00
No. 1 cupola cast.	.... 40.00

Los Angeles

No. 1 hvy. melting	$28.00 to $30.00
No. 2 hvy. melting	24.00 to 26.00
No. 1 bundles	27.00 to 29.00
No. 2 bundles	22.00 to 23.00
No. 3 bundles	18.00 to 20.00
Machine shop turn.	.... 8.00
Shoveling turnings	.... 10.00
Cast iron borings	.... 10.00
Elec. furn. 1 ft. and under	28.00 to 30.00
No. 1 RR. hvy. melting	28.00 to 30.00
No. 1 cupola cast.	$41.00 to 42.00

Seattle

No. 1 hvy. melting	.... $29.00
No. 2 hvy. melting	.... 25.00
No. 1 bundles	.... 21.00
No. 2 bundles	.... 20.00
No. 3 bundles	.... 14.00
No. 1 cupola cast.	.... 35.00
Mixed yard cast.	.... 35.00

Hamilton, Ont.

No. 1 hvy. melting	.... $32.00
No. 2 hvy. melting	.... 29.00
No. 1 bundles	.... 32.00
No. 2 bundles	.... 26.00
Mixed steel scrap	.... 26.00
Bushelings	.... 27.00
Bush., new fact prep'd	.... 30.00
Bush., new fact unprep'd	.... 26.00
Short steel turnings	.... 12.00
Mixed bor. and turn.	.... 12.00
Rails, rerolling	.... 41.00
Cast scrap	$42.00 to 45.00

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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EXPORTS - IMPORTS — LIVINGSTON & SOUTHARD, INC., 99 Park Avenue, New York, N. Y. *Cable Address:* FORENTRACO

Hit New Aluminum Output High

Produce 128,203 tons of aluminum in January . . . Seasonal potlines should start producing again soon . . . Alcoa expanding Texas smelters—By *R. L. Hatschek.*

◆ PRODUCTION records continue to highlight the news in aluminum. And, as absolute confirmation of confidence in the future of the aluminum market, Aluminum Co. of America is starting work immediately on a 10-pct expansion of its aluminum reduction capacity.

Nonferrous markets are hot today. Consumers want aluminum. and they want copper. They'll continue to get enough aluminum to operate on—but they may not be able to rebuild their inventories to levels which they'd now like. Copper is another matter, however. The real pinch is on with consumers going to the government for help via stockpile metal.

Zinc and lead continue to be firm but nothing like copper and aluminum. Imports, which caught a lot of blame for the shape of the lead-zinc mining industry a year ago, declined considerably in 1954 as compared to 1953.

ALUMINUM . . . The Big Three are continuing to rack up new monthly aluminum production records, January's total of 128,203 tons being the huskiest yet. Projecting this daily rate through the rest of the year would give a total output of 1,509,000 tons —without considering new facilities which will begin production shortly. Note also that a few potlines in the Southeast which were shut down seasonally because of low water did not enter the picture in January. They are expected to get back into production very soon.

Another note on basic aluminum production is the Texas expansion announced last week by Aluminum Co. of America (See p. 50). This 65,000-ton capacity boost at Rockdale and Point Comfort will be helping the industry set new production records in about 12 to 15 months.

As for the market itself—call it torrid. All of the ultra conservatives who said the Korean expansion was too much have now been forced to agree that it wasn't. But one of the factors currently making aluminum tight is inventory rebuilding.

Much of last year's slack was due to inventory depletion. Now purchasing agents are trying to rebuild. They're using more metal and they're also trying to build up stocks as a hedge against probable higher prices in second half following the 1955 wage settlement. Some may be worrying about a strike, but this isn't likely.

The secondary market is also kicking up its heels with alloy ingot prices still on the march. Remelt aluminum ingot prices are now fully 3¢ to 3.25¢ per lb higher than they were at the beginning of the month.

COPPER . . . Rhodesian copper production last week was reported back up to about 65 pct of normal with about a third of the workers back on their jobs. But this still left a big empty section in the pipeline carrying the red metal to consumers. Bubble in the line will hit European users in about a month.

Meanwhile, in this country, consumers were banding together to get the government to release stockpiled copper. This would be in addition to diverting regular stockpile shipments. Government action extending the export limitations is also expected in an attempt to keep enough copper flowing to domestic industry.

In London the copper market is still having ups and downs, but the downs prevailed last week. Spot copper at the end of the week was quoted at 42.50¢ per lb in London, still nearly 10¢ per lb higher than here.

Domestic picture for January, painted by the Copper Institute statistics were as follows: Primary crude production, 87,350 tons (December 85,581 tons); refined output, 123,850 tons (December 133,523 tons); deliveries to fabricators, 113,949 tons (December 119,626 tons); and refined stocks at the end of the month, 45,982 tons (December 47,108 tons).

LEAD . . . Imports of refined lead last year totaled 276,282 tons, toppling from the 1953 tally of 385,071. Drop was 28 pct. On the other hand, imports of lead contained in ore, matte, etc., increased a bit from last year's 160,929 tons to 161,517 tons in 1954.

As for the day to day market—it's coasting again. Sales volume is fair to good, but not like it was a few weeks ago.

Prices in London eased slightly during last week with Friday's closing bid at the New York equivalent, including duty and freight, of approximately 14.84¢ per lb.

ZINC . . . Galvanizers began to come into the market for March zinc tonnages last week giving Prime Western a healthy boost. Diecasters, meanwhile, are continuing their healthy buying pace. They're keeping their eyes on Detroit's continuing record performance, though, of course, they're thinking far ahead.

Statistically, there was a 33 pct decline in slab zinc imports in 1954. Total for the year was 156,896 tons as compared to 234,576 tons of slab zinc imported in 1953. Imports of ore also declined with a total zinc content of 448,624 tons coming in during 1954 as compared to 53's 513,383 tons.

London prices for zinc also slacked off somewhat at the end of the week. Prompt quotation there is just a shade under parity with New York at the equivalent of about 12.44¢ per lb.

MAGNESIUM . . . Year-end Magnesium Assn. foundry statistics showed a 26-pct drop from 1953 tonnages. Total magnesium casting shipments for '54 were 12,767 tons (1953 was 17,299 tons). Dip is attributed to defense "stretchout."

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Feb. 16	Feb. 17	Feb. 18	Feb. 19	Feb. 21	Feb. 22
Copper, electro, Conn.	33.00	33.00	33.00	33.00	33.00	....
Copper Lake, delivered	33.00	33.00	33.00	33.00	33.00	....
Tin, Straits, New York	90.25	90.625	90.75	....	90.50	....
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	....
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	....

Note: Quotations are going prices

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Alloymet 2030 (65% Nickel 30% Copper 5% Iron)*

A product of close Metallurgical CONTROL
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Pre-alloyed master alloys are leaving an indelible mark on the iron and steel industry. The element of human error is reduced many fold, since a single alloying agent, ALLOYMET 2030 ingot or shot, can replace many separate inoculants. A single trial of Alloymet 2030 or its companion alloys will make you an "Alloymet regular."

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*Nominal Chemical Composition

ALTER COMPANY
Alloy Metal Division
1701 Rockingham Road, DAVENPORT, IOWA
Phone 6-2561 Teletype DV 588

Nonferrous Prices *(Effective Feb. 22, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003	39.1	37.1	35.9	35.5
3004	44.0	39.8	38.1	37.6
5052	46.7	41.9	40.2	39.3
2024-O, -OAL	49.4	40.8	39.3	39.4
7075-O, -OAL	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 5, 58.7¢ to 66.7¢; 12 to 14, 39.4¢ to $1.04; 24 to 26, 42.2¢ to $1.35; 36 to 38, 49.5¢ to $1.97.

Rod, Round: Rolled, 1.064-4.5 in. 1100-F, 43.6¢ to 40.1¢; cold finished, 0.375-3.499 in. 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, ⅛-11/32 in., 69.5¢ to 50.1¢; ⅜-1½ in., 49.9¢ to 46.9¢; 1 9/16-3 in., 46.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.5¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.2¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1¼-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.2¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42⅝ x 60-in., $2.998; x 96-in., $4.801; x 120-in., $6.002; x 144-in., $7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 50.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 67¢; ⅛ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ⅝ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.2¢; 0.22 to 0.25 lb, 5.9 in., 62.5¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.48; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 84¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $11; Bar, HR or forged, $9; Forgings, $9.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	78	99
Strip, CR	102	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube	122	108	153
Shot, Blocks		65	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	49.79		51.86
Copper, h-r	51.76	48.11	
Copper, drawn		49.36	
Low brass	47.86	47.29	
Yellow brass	44.27	44.21	
Red brass	48.44	48.38	
Naval brass		42.49	43.75
Leaded brass	44.27	35.36	41.41
Com. bronze	50.08	50.02	
Mang. bronze		46.02	47.58
Phos. bronze	70.12	70.62	
Munts metal		42.15	43.40
Ni silver, 10 pct	58.25	60.58	

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.71
Rod, bar, wire	1.68

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	23.20
Aluminum pig	21.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb conta'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	33.00
Copper, Lake, delivered	33.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $120
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
ingot	27.75
Magnesium, sticks, 100 to 500 lb,	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$322 to $324
Nickel electro, f.o.b. N. Y. warehouse	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$18 to $20
Platinum, dollars per troy oz.	$78 to $80
Silver, New York, cents per troy oz.	85.25
Tin, New York	90.50
Titanium, sponge, grade A-1	$4.50
Zinc, East St. Louis	11.50
Zinc, New York	12.00
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	32.00
No. 120	32.50
No. 123	32.00
80-10-10 ingot	
No. 305	37.00
No. 315	34.75
88-10-2 ingot	
No. 210	45.75
No. 215	42.25
No. 245	37.75
Yellow ingot	
No. 405	28.75
Manganese bronze	
No. 421	30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	28.50-29.50
0.60 copper max.	28.00-29.25
Piston alloys (No. 122 type)	27.75-29.00
No. 12 alum. (No. 2 grade)	26.50-28.00
108 alloy	27.25-28.50
195 alloy	28.25-29.25
13 alloy (0.60 copper max.)	28.00-29.25
ASX-679	27.25-28.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	28.00-29.50
Grade 2—92-96%	27.25-28.50
Grade 3—90-92%	26.50-27.50
Grade 4—85-90%	26.00-26.75

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.92
Electrodeposited	39.78
Flat rolled	45.42
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	90.50*
Cadmium	$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.00
Copper sulphate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	31.25*
Nickel chloride, 200 to 400 lb	43.50*
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

*Effective Jan. 3.

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28½
Yellow brass	21⅞	20⅛
Red brass	25⅛	24⅝
Comm. bronze	26⅝	25⅞
Mang. bronze	20⅝	19½
Yellow brass rod ends	21⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	33½
No. 2 copper wire	32
Light copper	30½
*Refinery brass	28 —28½

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	30½—31
No. 2 copper wire	29 —29½
Light copper	27½—28
No. 1 composition	26 —26½
No. 1 comp. turnings	25½—26
Rolled brass	20 —20½
Brass pipe	20¾—21
Radiators	21 —21½
Aluminum	
Mixed old cast	16 —17
Mixed new clips	17½—18½
Mixed turnings, dry	16 —17⅛
Pots and pans	16 —17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	29½—30
No. 2 heavy copper and wire	28 —28½
Light copper	26 —26½
New type shell cuttings	26 —26½
Auto radiators (unsweated)	18½—19
No. 1 composition	23 —24
No. 1 composition turnings	22½—23½
Unlined red car boxes	18½—19
Cocks and faucets	19½—20
Mixed heavy yellow brass	16½—17
Old rolled brass	18 —18½
Brass pipe	19½—20
New soft brass clippings	21
Brass rod ends	19
No. 1 brass rod turnings	18
Aluminum	
Alum. pistons and struts	10 —11
Aluminum crankcases	13 —13½
1100 (2S) aluminum clippings	16 —16½
Old sheet and utensils	13 —13½
Borings and turnings	8 — 9
Misc. cast aluminum	13 —13½
2024 (24s) clippings	14½—15
Zinc	
New zinc clippings	7
Old zinc	5½
Zinc routings	2½— 3¾
Old die cast scrap	3¼— 3½
Nickel and Monel	
Pure nickel clippings	57 —60
Clean nickel turnings	40 —43
Nickel anodes	57 —60
Nickel rod ends	57 —60
New Monel clippings	25 —26
Clean Monel turnings	20 —21
Old sheet Monel	33 —34
Nickel silver clippings, mixed	16 —17
Nickel silver turnings, mixed	14 —15
Lead	
Soft scrap lead	11½—11¾
Battery plates (dry)	6 — 6¼
Batteries, acid free	4¼
Magnesium	
Segregated solids	18½—19
Castings	17½—18
Miscellaneous	
Block tin	70 —75
No. 1 pewter	50 —55
No. 1 auto babbitt	45
Mixed common babbitt	12 —12½
Solder joints	17
Siphon tops	45
Small foundry type	16½—16¾
Monotype	15 —15¼
Linc. and stereotype	14½—14¾
Electrotype	12½—12½
Hand picked type shells	10½—10⅝
Linc. and stereo. dross	6½
Electro dross	5

IRON AGE

STEEL PRICES

(Effective Feb. 22, 1955)

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		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$86.00 *B3*		4.30 *B3*	6.45 *B3*	4.30 *B3*						
	Buffalo, N. Y.	$64.00 *B3*	$78.00 *B3, R3*	$86.00 *B3, R3*	5.075 *B3*	4.30 *B3*	6.45 *B3*	4.30 *B3*	4.05 *B3,R3*	5.75 *B3,R7*	6.15 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.10 *A2*	5.80 *A2*	6.15 *A2*			
	New Bedford, Mass.									6.20 *R6*				
	Johnstown, Pa.	$64.00 *B3*	$78.00 *B3*	$86.00 *B3*		4.30 *B3*	6.45 *B3*		4.05 *B3*					
	Fairless, Pa.													
	New Haven, Conn.									6.20 *D1* 6.50 *A5*				
	Phoenixville, Pa.					3.95 *P2*		4.30 *P2*						
	Sparrows Pt., Md.								4.05 *B3*	5.75 *B3*	6.15 *B3*	8.425 *B3*		
	Bridgeport, Wallingford, Conn.	$69.00 *N8*	$83.00 *N8*						4.35 *N8*	6.20 *W1*			7.00 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.30 *N7* 6.60 *A5*				12.75 *A5* 12.80 *N7*
MIDDLE WEST	Alton, Ill.								4.225 *L1*					
	Ashland, Ky.								4.05 *A7*					
	Canton-Massillon, Dover, Ohio		$80.00 *R3*	$86.00 *R3, T5*										12.45 *G4*
	Chicago, Ill.	$64.00 *U1*	$78.00 *R3, U1,W8*	$86.00 *U1, W8,R3*	5.075 *U1*	4.25 *U1, W8*	6.40 *U1, Y1*	4.25 *U1*	4.05 *A1,N4 W8*	5.85 *A1*				
	Cleveland, Ohio									5.75 *A5,J3*		8.60 *A5*		12.45 *A5*
	Detroit, Mich.			$86.00 *R5*					4.15 *G3,M2*	5.85 *D1,D2, G3,M2,P11*	6.25 *G3*	8.70 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$64.00 *U1*	$78.00 *U1*	$86.00 *U1, Y1*	5.075 *I3*	4.25 *I3, U1*	6.40 *U1, I3*		4.05 *I3, U1,Y1*	5.85 *I3*	6.15 *U1, I3,Y1*	8.60 *Y1*	6.70 *U1, Y1*	
	Sterling, Ill.								4.15 *N4*					
	Indianapolis, Ind.									5.90 *C5*				
	Newport, Ky.												6.70 *Y5*	
	Middletown, Ohio									5.75 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								4.05 *S1,R3*	5.75 *S1,R5, T4*	6.15 *S1, R3*	8.60 *S1, R3*	6.70 *S1*	12.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$64.00 *U1, J3*	$78.00 *J3, U1,C11*	$86.00 *U1, C11*	5.075 *U1*	4.25 *J3, U1*	6.40 *J3, U1*	4.25 *U1*	4.05 *P6*	5.75 *B4,J3*			6.70 *S9*	12.45 *S9*
	Portsmouth, Ohio								4.05 *P7*	5.75 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 *W3*			4.05 *W3*	5.75 *F3,W3*	6.15 *W3*	8.60 *W3*		
	Youngstown, Ohio		$78.00 *C10*	$86.00 *Y1, C10*		4.25 *Y1*	6.40 *Y1*		4.05 *U1,Y1*	5.75 *Y1,C5*	6.15 *U1, Y1*	8.60 *Y1*	6.70 *U1, Y1*	12.45 *C5*
WEST	Fontana, Cal.	$72.00 *K1*	$86.00 *K1*	$105.00 *K1*		4.90 *K1*	7.05 *K1*	5.25 *K1*	4.825 *K1*	7.65 *K1*	7.25 *K1*		8.10 *K1*	14.55 *K1*
	Geneva, Utah		$78.00 *C7*			4.25 *C7*	6.40 *C7*							
	Kansas City, Mo.					4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	
	Los Angeles, Torrance, Cal.		$87.50 *B2*	$106.00 *B2*		4.95 *B2, C7*	7.10 *B2*		4.80 *B2,C7*	7.80 *C1*				
	Minnequa, Colo.					4.70 *C6*			5.15 *C6*					
	Portland, Ore.					5.00 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$87.50 *B2*			4.90 *B2* 4.95 *P9*	7.05 *B2*		4.80 *B2,C7*					
	Seattle, Wash.		$91.50 *B2*			5.60 *B2*	7.15 *B2*		5.05 *B2, P12*					
SOUTH	Atlanta, Ga.								4.25 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$64.00 *T2*	$78.00 *T2*			4.25 *C16, R3,T2*	6.40 *T2*		4.05 *R3, T2,C16*		6.15 *T2*			
	Houston, Tex.		$83.00 *S2*	$91.00 *S2*		4.30 *S2*	6.45 *S2*				6.40 *S2*		6.95 *S2*	

IRON AGE

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 10 ga. & heavier	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 20 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.05 *B3*	4.95 *B3*				6.10 *B3*	7.50 *B3*			4.675 *W6*	† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.10 *A2*	5.00 *A2*				6.15 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.675 *B3*			
	Fairless, Pa.	4.10 *U1*	5.00 *U1*				6.15 *U1*	7.55 *U1*				$8.90 *U1*	$7.60 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.05 *B3*	4.95 *B3*	5.45 *B3*			6.10 *B3*	7.50 *B3*	8.20 *B3*		4.775 *B3*	$8.90 *B3*	$7.60 *B3*	
	Worcester, Mass										4.975 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.85 *L1*			
	Ashland, Ky.	4.05 *A7*		5.45 *A7*	5.375 *A7*									
	Canton-Massillon, Dover, Ohio			5.45 *R1,R3*						5.175 *R1*				
	Chicago, Joliet, Ill.	4.05 *A1, W8*					6.10 *U1*				4.675 *A5, N4,R3*			
	Sterling, Ill.										4.775 *N4*			
	Cleveland, Ohio	4.05 *J3, R3*	4.95 *J3, R3*		5.375 *R3*		6.10 *J3, R3*	7.50 *J3, R3*			4.675 *A5*			
	Detroit, Mich.	4.15 *G3, M2*	5.05 *G3*				6.20 *G3*	7.60 *G3*						
	Newport, Ky.	4.05 *N5*	4.95 *N5*	5.45 *N5*										
	Gary, Ind. Harbor, Indiana	4.05 *I3, U1,Y1*	4.95 *I3, U1,Y1*	5.45 *U1, I3*	5.375 *I3, U1*	5.85 *U1*	6.10 *U1, I3,Y1*	7.50 *U1, Y1*			4.675 *Y1*	$8.80 *I3, U1,Y1*	$7.50 *I3, U1,Y1*	6.20 *U1, Y1*
	Granite City, Ill.	4.25 *G2*	5.15 *G3*	5.65 *G3*	5.575 *G3*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.15 *C9*		5.55 *C9*						5.20 *C9*	4.775 *C9*			
	Mansfield, Ohio					5.85 *E2*				5.175 *E2*				
	Middletown, Ohio		4.95 *A7*		5.375 *A7*	5.85 *A7*								
	Niles, Ohio Sharon, Pa.	4.05 *S1,R3* 5.30 *N3*	4.95 *R3* 5.975 *N3*	5.45 *N3*	6.725 *N3*	5.85 *N3*	6.10 *S1,R3*	7.50 *R3*				$8.80 *R3*	$7.50 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 *J3, U1,P6*	4.95 *J3, U1,P6*	5.45 *U1*	5.375 *U1*		6.10 *J3, U1*	7.50 *J3, U1*	8.20 *U1*		4.675 *A5* 4.675 *P6*	$8.80 *J3, U1*	$7.50 *J3, U1*	6.20 *U1*
	Portsmouth, Ohio	4.05 *P7*	4.95 *P7*								4.675 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.05 *W3, W5*	4.95 *W3, W5,F5*	5.45 *W3, W5*		5.85 *W3, W5*	6.10 *W3*	7.50 *W3*				$8.80 *W3, W5*	$7.50 *W3, W5*	6.20 *F5, W5*
	Youngstown, Ohio	4.05 *U1, Y1*	4.95 *Y1*		5.375 *Y1*		6.10 *U1, Y1*	7.50 *Y1*			4.675 *Y1*			
WEST	Fontana, Cal.	4.825 *K1*	6.05 *K1*				6.875 *K1*	8.55 *K1*			5.475 *K1*			
	Geneva, Utah	4.15 *C7*												
	Kansas City, Mo.										4.925 *S2*			
	Los Angeles, Torrance, Cal.										5.475 *C7, B2*			
	Minnequa, Colo.										4.925 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.75 *C7*	5.90 *C7*	6.20 *C7*							5.325 *C7*	$9.55 *C7*	$8.25 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.05 *R3, T2*	4.95 *T2*	5.45 *R3, T2*			6.10 *T2*			5.35 *R3*	4.675 *T2, R3*	$8.90 *T2*	$7.60 *T2*	
	Houston, Texas										4.925 *S2*			

IRON AGE

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'n. Bright
EAST	Bethlehem, Pa.				5.075 *B3*	6.625 *B3*	6.45 *B3*					
	Buffalo, N. Y.	4.30 *B3,R3*	4.30 *B3,R3*	5.45 *B5*	5.075 *B3,R3*	6.625 *B3,B5*	6.45 *B3*	4.225 *B3,R3*			6.45 *B3*	5.75 *W6*
	Claymont, Del.							4.225 *C4*		5.80 *C4*		
	Coatesville, Pa.							4.225 *L4*		5.80 *L4*	6.45 *L4*	
	Conshohocken, Pa.							4.225 *A2*	5.275 *A2*		6.45 *A2*	
	Harrisburg, Pa.							3.975 *C3*	5.275 *C3*			
	Hartford, Conn.			5.90 *R3*		6.925 *R3*						
	Johnstown, Pa.	4.30 *B3*	4.30 *B3*		5.075 *B3*		6.45 *B3*	4.225 *B3*		5.80 *B3*	6.45 *B3*	5.75 *B3*
	Fairless, Pa.	4.45 *U1*	4.45 *U1*		5.225 *U1*							
	Newark, N. J.			5.85 *W10*		6.80 *W10*						
	Camden, N. J.			5.85 *P10*								
	Bridgeport, Putnam, Conn.	4.55 *N8*		5.95 *W10*	5.225 *N8*			4.475 *N8*				
	Sparrows Pt., Md.		4.30 *B3*					4.225 *B3*		5.80 *B3*	6.45 *B3*	5.85 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			5.85 *W11* 5.95 *B5,C14*		6.925 *A5,B5*						6.05 *A5, W6*
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.925 *L1*
	Ashland, Newport, Ky.							4.225 *A7,N5*		5.80 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.40 *R3*		5.40 *R2,R3*	5.075 *R3,T5*	6.625 *R2,R5, T5*		4.225 *E2*				
	Chicago, Joliet, Ill.	4.30 *U1, N4,W8,R3*	4.30 *N4,R3*	5.40 *A5,W10, W8,B5,L2*	5.075 *U1,R3, W8*	6.625 *A5,W8, W10,L2,B5*		4.225 *U1,W8, I5,A1,R3*	5.275 *U1*	5.80 *U1*	6.45 *U1*	5.75 *A5, R3,N4,W7*
	Cleveland, Ohio	4.30 *R3*	4.30 *R3*	5.40 *A5,C13*		6.625 *A5,C13*	6.45 *R3*	4.225 *J3,R3*	5.275 *J3*		6.45 *J3,R3*	5.75 *A5, C13*
	Detroit, Mich.	4.40 *G3* 4.45 *R5*		5.40 *R5* 5.60 *B5,P8* 5.65 *P3*	5.075 *R5* 5.175 *G3*	6.625 *R5* 6.825 *B5,P3, P8*	6.55 *G3*	4.325 *G3*			6.55 *G3*	
	Duluth, Minn.											5.75 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.30 *I3, U1, Y1*	4.30 *I3, U1, Y1*	5.40 *M5,R3*	5.075 *I3, U1, Y1*	6.625 *M5, R3*	6.45 *U1,I3, Y1*	4.225 *I3, U1,Y1*	5.275 *I3*	5.80 *U1,Y1*	6.45 *U1,I3, Y1*	5.85 *M4*
	Granite City, Ill.							4.425 *G2*				
	Kokomo, Ind.											5.85 *C9*
	Sterling, Ill.	4.40 *N4*	4.40 *N4*									5.85 *N4*
	Niles, Ohio Sharon, Pa.	4.30 *R3*					6.45 *R3*	4.225 *S1,R3*		5.80 *S1*	6.45 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.30 *J3, U1, C11*	4.30 *J3, U1*	5.40 *A5,C8, C11,J3, W10,B4,R3*	5.075 *U1,C11*	6.625 *A5,C11, W10,C8,R3*	6.45 *J3, U1*	4.225 *J3, U1*	5.275 *U1*	5.80 *U1*	6.45 *J3, U1*	5.75 *A5,J3, P6*
	Portsmouth, Ohio											5.75 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.30 *W3*						4.225 *W3, W5*				
	Youngstown, Ohio	4.30 *U1,Y1, C10,R3*	4.30 *U1,Y1, R3*	5.40 *F2,Y1, C10*	5.075 *U1,Y1, C10*	6.625 *Y1,C10* 6.665 *F2*	6.45 *U1,Y1*	4.225 *U1,Y1, R3*		5.80 *Y1*	6.45 *Y1*	5.75 *Y1*
WEST	Emeryville, Cal.	5.05 *J5*	5.05 *J5*									
	Fontana, Cal.	5.00 *K1*	5.00 *K1*		6.125 *K1*		7.70 *K1*	4.875 *K1*		6.45 *K1*	7.15 *K1*	
	Geneva, Utah							4.225 *C7*			6.45 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*					6.00 *S2*
	Los Angeles, Torrance, Cal.	5.00 *B2,C7*	5.00 *B2,C7*	6.85 *R3*	6.125 *B2*		7.15 *B2*					6.70 *B2*
	Minnequa, Colo.	4.75 *C6*	4.75 *C6*					5.075 *C6*				6.00 *C6*
	Portland, Ore.	5.05 *O2*	5.05 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.00 *C7,P9* 5.05 *B2*	5.00 *C7,P9* 5.05 *B2*				7.20 *B2*					6.70 *C7*
	Seattle, Wash.	5.05 *B2,P12, N6*	5.05 *B2,P12*				7.20 *B2*	5.125 *B2*		6.70 *B2*	7.35 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.95 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.30 *T2,C16, R3*	4.30 *T2,C16, R3*				6.45 *T2*	4.225 *T2,R3*			6.45 *T2*	5.75 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.325 *S2*		6.70 *S2*	4.55 *L3* 4.275 *S2*		5.85 *S2*	6.50 *S2*	6.00 *S2*

Steel Prices *(Effective Feb. 22, 1955)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Keppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	⅛ In.		¼ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	22.75	9.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	10.75	W4.5	13.75	W6.5	16.25	3.0	16.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	6.75	20.0	3.25	21.5	4.75
Alton, Ill. *L1*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	6.75	20.0	3.25	21.5	4.75
Wheeling *W5*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	6.75	20.0	3.25	21.5	4.75
Indiana Harbor *Y1*	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N3*	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	W1.50	17.5	6.75	20.0	3.25	21.5	4.75
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	16.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	16.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	6.75	23.5	10.75
Alton, Ill. *L1*	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	16.75	32.75	19.25	33.25	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	6.75	23.5	10.75
Wheeling *W5*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	6.75	23.5	10.75
Indiana Harbor *Y1*	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N3*	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.75	35.25	20.0	14.0	.....	19.0	3.25	21.5	6.75	23.5	10.

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers discount, 5 pct. Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ⅝ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

Steel Prices

(Effective Feb. 22, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.45	5.35	5.425	.....	.....	.....	.....
So. Chicago *R3*	.....	.....	.....	7.30	.....	.....	.....
Ensley *T2*	4.45	5.35	.....	.....	.....	.....	.....
Fairfield *T2*	.....	5.35	.....	7.30	.....	5.275	.....
Gary *U1*	4.45	5.35	.....	.....	.....	5.275	.....
Ind. Harbor *I3*	4.45	.....	5.425	7.30	.....	5.275	.....
Johnstown *B3*	.....	5.35	.....	.....	.....	.....	.....
Joliet *U1*	.....	5.35	5.425	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	7.30	.....	.....	11.50
Lackawanna *B3*	4.45	5.35	5.425	.....	.....	5.275	.....
Minnequa *C6*	4.45	5.85	5.425	7.30	.....	5.275	11.50
Pittsburgh *O1*	.....	.....	.....	.....	11.00	.....	11.50
Pittsburgh *P5*	.....	.....	.....	.....	11.00	.....	11.50
Pittsburgh *J3*	.....	.....	.....	7.30	.....	.....	.....
Seattle *B2*	.....	.....	.....	7.60	.....	5.425	12.00
Steelton *B3*	4.45	.....	5.425	.....	.....	5.275	.....
Struthers *Y1*	.....	.....	.....	7.30	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	5.425	.....
Williamsport *S5*	.....	5.35	.....	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	7.30	.....	.....	.....

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.025	8.225	.....
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. 72	11.95	12.20	12.70
		Grain Oriented	
Trans. 65	12.50	.....	.....
Trans. 58	13.00	Trans. 80	16.60
Trans. 52	14.00	Trans. 73	17.10

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I5*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

*Coils 7½¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*35.50	
Washington, Pa., *J2*	.....	
Claymont, Del., *C4*	.....	
New Castle, Ind., *I2*	.....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	39.50	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	47.90	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	40.80	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire ¢/lb.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	137	146	...	155	159	6.90	7.30
Aliquippa, Pa. *J3*	137	149	.....	.....	156	6.90	7.425
Atlanta *A8*	139	151	.....	157	164	7.00	7.525
Bartonville *K2*	139	151	.....	157	164	7.00	7.55
Buffalo *W6*	.....	.....	.....	.....	.....	6.90	7.30
Chicago, Ill. *N4*	137	149	.....	155	162	6.90	7.45
Cleveland *A6*	142	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	6.90	.....
Crawfordsville *M4*	139	151	.....	157	159	7.00	7.55
Donora, Pa. *A5*	137	146	.....	155	159	6.90	7.30
Duluth *A5*	137	146	150	155	159	6.90	7.30
Fairfield, Ala. *T2*	137	146	.....	155	159	6.90	7.30
Galveston *D4*	139	.....	.....	.....	.....	.....	.....
Houston *S2*	142	154	.....	.....	164	7.15	7.75
Johnstown, Pa. *B3*	137	149	.....	.....	162	6.90	7.45
Joliet, Ill. *A5*	137	146	.....	155	159	6.90	7.30
Kokomo, Ind. *C9*	139	148	.....	157	161	7.00	7.55
Los Angeles *B2*	.....	.....	.....	.....	.....	7.05	.....
Kansas City *S2*	142	158	.....	167	164	7.15	7.90
Minnequa *C6*	142	151	155	160	164	7.15	7.55
Monessen *P6*	137	151	.....	.....	163	6.90	7.45
Moline, Ill. *R3*	.....	.....	145	.....	.....	.....	.....
Pittsburg, Cal. *C7*	156	169	...	179	179	7.05	8.28
Portsmouth *P7*	.....	.....	.....	.....	.....	6.90	7.90
Rankin, Pa. *A5*	137	146	.....	.....	159	6.90	7.30
So. Chicago *R3*	137	146	145	155	159	6.90	7.30
S. San Francisco *C6*	.....	.....	.....	.....	179	.....	.....
Sparrows Pt. *B3*	139	.....	.....	157	164	7.00	7.55
Struthers, O. *Y1*	.....	.....	.....	.....	.....	6.90	7.55
Worcester *A5*	143	.....	.....	.....	.....	7.20	.....
Williamsport, Pa. *S5*	.....	.....	150	.....	.....	.....	.....

Cut Nails, carloads, base $8.30 per keg at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra Galvanized products computed with zinc at 11.0¢ per lb

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, New Britain, Conn. *N8*	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. *R1*	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. *S9*	.....	8.05	9.00	11.15	13.85
Cleveland *A5*	5.75	8.05	9.00	11.15	13.85
Detroit *D1*	5.85	8.25	9.20	10.95	.....
Detroit *D2*	5.85	8.25	9.20	.....	.....
Harrison, N. J. *C11*	.....	.....	9.30	11.45	14.15
Indianapolis *C5*	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. *B4*	5.75	8.05	9.00	10.95	.....
New Haven, Conn. *D1*	6.20	8.35	9.30	11.25	.....
Pawtucket, R. I. *N7*	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. *A1*	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. *S1*	5.75	8.05	9.00	11.15	13.85
Trenton *R4*	.....	8.35	9.30	11.25	13.40
Wallingford *W1*	6.20	8.35	9.30	11.45	14.15
Warren, Ohio *T4*	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. *W3*	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. *A5*	6.60	8.35	9.30	11.45	14.15
Youngstown *C5*	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95
	2½	12	38.15	45.74	37.00	44.36
	3	12	44.05	52.82	42.72	51.23
	3½	11	51.43	61.66	49.88	59.81
	4	10	68.29	81.88	66.24	79.42
National Tube	2	13	28.33	33.97	27.48	.....
	2½	12	38.15	45.74	37.00	.....
	3	12	44.05	52.82	42.72	.....
	3½	11	51.43	61.66	49.88	.....
	4	10	68.29	81.88	66.24	.....
Pittsburgh Steel	2	13	28.33	33.97	.....	.....
	2½	12	38.15	45.74	.....	.....
	3	12	44.05	52.82	.....	.....
	3½	11	51.43	61.66	.....	.....
	4	10	68.29	81.88	.....	.....

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities / City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: As rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore ..... $.20	6.22	7.51	7.78	6.89	.....	6.57	6.92	6.68	8.52	.....	.....	.....	.....
Birmingham ..... .15	6.35-6.50	7.35-8.10	8.25-9.00	6.60	9.60	6.65	6.65	6.50	9.00	.....	.....	.....	.....
Boston ..... .10	7.23	8.23	9.42-9.52	7.47	9.65-9.85	7.34-7.37	7.49	7.20	8.60-8.70	12.60-12.80	12.60	15.15	15.25
Buffalo ..... .20	6.35-6.40	7.40[3] 7.45	8.80-8.84	6.75	.....	6.65-6.70	6.70-6.77	6.50-6.55	7.85[3] 7.90	12.50	12.30	14.65	14.90[3]
Chicago ..... .20	6.38	7.38	8.30	6.62	.....	6.52	6.69	6.51	7.50	12.25	12.05	14.60	14.70
Cincinnati ..... .15	6.49-6.53	7.37-7.42	8.25-8.30	6.86-6.91	.....	6.81-6.86	6.91	6.75-6.80	7.80-7.85	12.55	12.35	14.90	15.00
Cleveland ..... .20	6.38	7.38	8.25	6.72	.....	6.69	7.02	6.57	7.60	11.96	12.11	.....	14.76
Denver	8.15	9.15	10.37	8.40	.....	8.10	8.15	8.30	9.27	.....	.....	.....	16.30
Detroit ..... .20	6.57	7.57	8.50-8.58	6.90	.....	6.80-6.85	7.16	6.79	7.77	12.45	12.35	14.80	14.90
Houston ..... .20	7.35	7.80	9.93	7.70	.....	7.35	7.60	7.70	9.50	.....	13.10	.....	.....
Kansas City ..... .20	7.05	8.05	8.95	7.29	.....	7.19	7.36	7.18	8.07-8.27	.....	12.27	.....	.....
Los Angeles ..... .20	7.50	9.35	9.95	7.85	.....	7.45	7.65	7.45	10.15	.....	13.35	.....	16.50
Memphis ..... .10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	8.24	.....	.....	.....	.....
Milwaukee ..... .20	6.47	7.47	8.21-8.39	6.71	.....	6.61	6.86	6.60	7.69	12.34	12.14	14.69	14.79
New Orleans ..... .15	6.70	7.65	9.23	6.80	.....	6.90-6.95	7.05	6.80	8.70-10.70	.....	.....	.....	.....
New York ..... .10	6.97-6.98	7.78-8.46	8.79[1] 8.99	7.36-7.56	.....	7.18-7.27	7.13-7.38	7.20-7.37	8.63-8.73[2]	12.63	12.43	.....	15.05
Norfolk ..... .20	7.00	.....	.....	7.10	.....	7.10	7.10	7.10	8.80	.....	.....	.....	.....
Philadelphia ..... .10	6.19	7.29[3]	8.09[4] 8.23	6.96	.....	6.49	6.54	6.74	8.19[3]	.....	11.66-12.21	.....	14.86
Pittsburgh ..... .20	6.38	7.38	8.30-8.50	6.72-6.75	.....	6.52	6.69	6.51	7.85	12.25	12.05	14.60	14.70
Portland ..... .20	7.60	8.75	9.05	7.85	.....	7.45	7.50	7.55	10.95	.....	.....	.....	.....
Salt Lake City .. .20	7.65	10.20	10.70	9.05	.....	7.70	7.70-8.05	8.80	10.95	.....	.....	.....	.....
San Francisco .. .20	7.55	8.95	9.35-9.85	7.89	.....	7.40	7.50	7.35	10.05	.....	13.35	.....	16.50
Seattle ..... .00	8.10	9.80	10.15	8.20	.....	7.80	7.75	7.80	10.95	.....	13.80	.....	16.45
St. Louis ..... .20	6.62-6.67	7.67	8.54-8.59	6.91	.....	6.81	7.09	6.80	7.89	12.54	12.34	14.54-14.89	14.99
St. Paul ..... .15	7.03	8.03-8.58	8.96	7.28	.....	7.19	7.35	7.16	8.26	.....	12.56	.....	15.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

Miscellaneous Prices

(Effective Feb. 22, 1955)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.54
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium	.72
Oil hardened manganese	.405
Special carbon	.27
Extra carbon	.31
Regular carbon	.26

Warehouse prices on and east of Mississippi are 2.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24 in., del'd N. Y.	115.00 to 114.00
6 to 24-in., Birmingham	98.00 to 102.50

6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less ..... $129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	24.05
Seaboard, N. J., f.o.b.	21.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.00
Painesville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	20.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
18 to 17	72	20.50	30	110	8.95
7 to 16	60	21.00	24	72 to 84	9.10
8	60	23.25	20	90	9.85
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount Less Case	C.
½ in. & smaller x 4 in. & shorter	2	22
½ in. & smaller x 6 in. & shorter	+3	18
9/16 in. & ⅝ in. x 6 in. & shorter	+4	17
¾ in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
½ in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+3	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	*Discount, Case or Keg*
⅜" or smaller	55	64
⅞" to 1⅛" inclusive	58	66
1¼" to 1½" inclusive	60	67½

C.P. Hex regular & hvy.

All sizes	55	64

Hot Galv. Nuts (all types)

⅜" or smaller	38	50
⅞" to 1½" inclusive	41	52½

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes	55	66

Rivets

	Base per 100 lb
½ in. & larger	$9.25
	Pct Off List
7/16 in. and smaller	37

Cap Screws

	Discount Bright	*H.C. Heat Treated*
New std. hex head, packaged ⅝" x 6" and smaller and shorter	38	28
⅝", ¾", 1" x 6" and shorter	15	1
New std. hex head, bulk* 5" x 6" and smaller and shorter	50	42
⅝", ¾", 1" x 6" and shorter	32	21

* Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

	Quantity	*Discount* Mach. Screws	Stove Bolts
Packaged, package list		33	43
Bulk, bulk list			
¼-in. diam. & under	15,000- 99,999	59	17
	100,000-199,999	63	25
	200,000 & over	67	32
5/16-in. diam. & larger	15,000- 49,999	59	17
	50,000- 99,999	63	25
	100,000 & over	67	33
All diam. over 3 in. long	5,000- 49,999	59	..
	50,000- 99,999	63	..
	100,000 & over	67	..

Machine Screw & Stove Bolt Nuts

	Quantity	*Discount* Hex	Square
Packaged, package list		30	33
Bulk, bulk list			
⅜-in. diam. & smaller	15,000- 99,999	15	17
	100,000-199,999	23	25
	200,000 & over	31	32

REFRACTORIES

Fire Clay Brick	*Carloads per 1000*
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	17.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	.....
California	.....
Super Duty	
Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	.....

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt.	$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick	
Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite	*St. ⅝-in. grains*
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	15.10
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

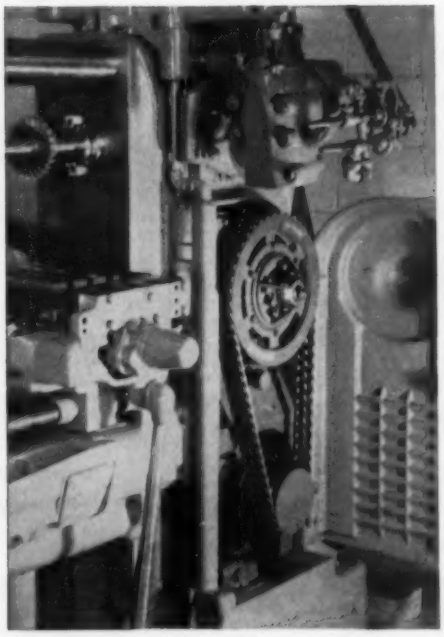
Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. ship. pt., carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, 99.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	81.0¢ to $1.45
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.5¢
Copper, reduced	43.5¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.05
Zinc, 10 ton lots	17.5¢ to 25.0¢

Can Veelos V-Belts

CUT VIBRATION

20% to 90% in <u>your</u> machines?



MACHINE vibration is usually caused by one or more of these five factors: bearings; motor; clutch; sheaves; v-belts. Frequently, v-belts alone are the major cause of vibration.

Actual performance on many different types of machine tools has proved that Veelos v-belts can reduce vibration 20% to 90%.

Here's why this is so...

Regular v-belts have spots of varying density due to their construction. These spots, though not apparent, throw the belt out of balance when the drive is operating. Vibration is created which not only can cause excessive wear on parts of the machine but which may also damage the finished work.

Veelos v-belts have none of these spots. Every Veelos belt is perfectly balanced throughout its entire length. Every Veelos link and stud is absolutely uniform. The smooth, machine-cut sides and the laminated construction of the belt assure full, vibrationless power delivery.

These facts can be readily demonstrated with an electronic analyser. This analyser measures amplitude of vibration to as low as 2-millionths of an inch. A few minutes is all that is required to show you that Veelos runs smoother and creates less vibration than regular v-belts.

Drop us a line or clip the coupon for a demonstration.

Veelos is known as Veelink outside the United States.

VEELOS
THE LINK
V-BELT

Manheim Manufacturing & Belting Company
653 Manbel St., Manheim, Pa.

Yes, I would like a demonstration with the electronic analyser. Have your representative call me for a convenient time.

Name.....

Company.....

Address.....

.....

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Ferroalloy Prices

(Effective Feb. 22, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C .. 36.00	0.15% C ... 33.75
0.025% C, Simplex .. 34.50	0.20% C ... 33.50
	0.50% C ... 33.25
0.06% C ... 34.50	1.00% C ... 33.00
0.10% C ... 34.00	2.00% C ... 32.75

65-69% Cr, 4-8% C 34.75
62-66 Cr, 4-6% C, 6.9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10 max. C	$1.18
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-16% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ¼ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 5-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn:

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$34.00
19 to 21%	3% max.	36.00
21 to 23%	3% max.	38.50
23 to 25%	3% max.	41.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $95.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $98.00. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo $1.23

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$12.00
Less ton lots	12.05

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta.... $6.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.46

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b. $3.80

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.27
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.24

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed	17.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Cerbortam, Ti 15-21%, B 1-2%, Si 3-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in., x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.00
No. 6	63¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

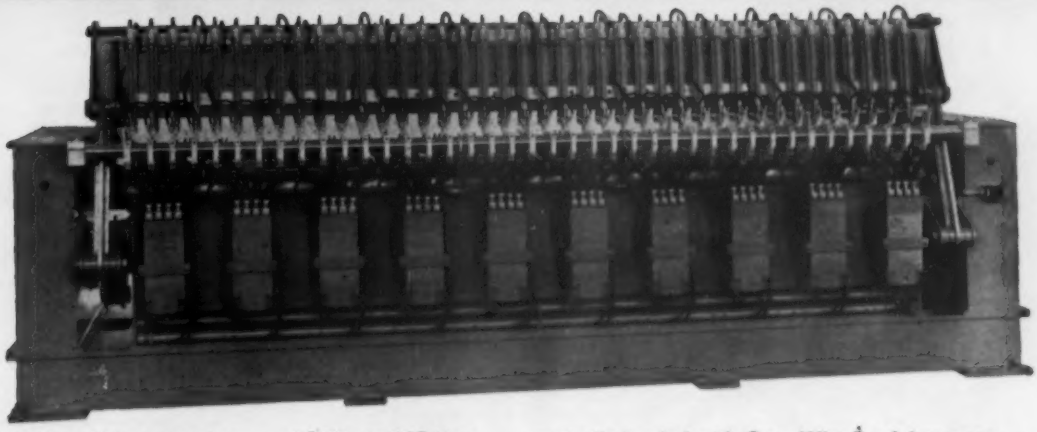
Ton lots	$1.48
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots $2.05

Silcas, contract basis, delivered.

Ton lots	45.00¢

Standard 13 ft. Wire Mesh Welding Machine



Sixty Cross Wires per minute . . . 2" Min. to 12" Max. Spacings . . . Easily Adjusted Cross Wire and Longitudinal Wire Spacing . . . Hand-Started Pattern not required to start New Mesh Pattern . . . Cross Wire may be Pre-Straightened and Hand-Loaded or Automatically loaded with Cross Wire Feed Accessory . . . **Accessories Available:** Cross Wire Feed, Take-up Mandrel, Longitudinal Wire Straightener . . . (Three Handwheels Adjust All Longitudinal Wire Straightener Rolls in Unison.)

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HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES
famous for performance since 1868

RAM TYPE TURRET LATHES

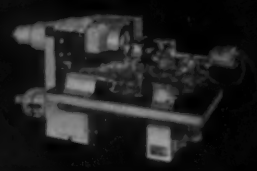
NO. 2 ALL-GEARED HEAD
1" Bar Capacity
14" Swing

NO. 3 UNIVERSAL
1⅛" Bar Capacity
15⅜" Swing

NO. 4 UNIVERSAL
2" Bar Capacity
18⅛" Swing

NO. 5 UNIVERSAL
2½" Bar Capacity
20" Swing

ELECTRO-CYCLES



NO. 1 ELECTRO-CYCLE
⅝" Bar Capacity
11" Swing

NO. 2 ELECTRO-CYCLE
1" Bar Capacity
14" Swing

NO. 3 ELECTRO-CYCLE
1½" Bar Capacity
15⅜" Swing

16" ELECTRO-CYCLE
1½" Bar Capacity
16⅞" Swing

SADDLE TYPE TURRET LATHES

Heavy Duty

1-A UNIVERSAL
2½" or 3" Bar Capacity
16¼" Swing

2-A UNIVERSAL
3½" Bar Capacity
20" Swing

3-A UNIVERSAL
4½" or 6" Bar Capacity
23½" Swing

4-A UNIVERSAL
8" 9" or 12" Bar Capacity
28¼" Swing

MULTI-SPINDLE AUTOMATICS

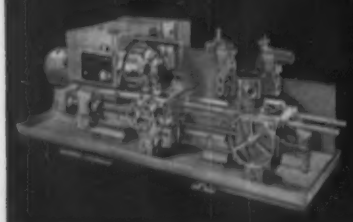
6-SPINDLE BAR MACHINE
¾" or 1¼" Bar Capacity

5-SPINDLE
CHUCKING MACHINE
6" Swing

5-SPINDLE BAR MACHINE
1¾" Standard Bar Capacity
2¼" Oversize Capacity

SADDLE TYPE TURRET LATHES

Extra Heavy Duty



1-A UNIVERSAL
2½" or 3" Bar Capacity
16¼" Swing

2-A UNIVERSAL
3½" or 4½" Bar Capacity
20" Swing

3-A UNIVERSAL
4½" or 6" Bar Capacity
23½" Swing

4-A UNIVERSAL
9" or 12" Bar Capacity
28¼" Swing

SINGLE SPINDLE AUTOMATICS

1 AC CHUCKING MACHINE
8" or 10" Chuck — 6" Working Stroke

2 AC CHUCKING MACHINE
10" or 12" Chuck — 9" Working Stroke

PRECISION TAPPING AND THREADING MACHINES

NO. 10
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0-80 to 10-24 Capacity

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TAPPING MACHINE
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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

West Coast Optimistic . . . Southern California's used machinery dealers are optimistic. They report more inquiries and somewhat increased business from a lot of smaller companies. "The whole feeling is good," one machinery man says, "even though we have to hustle harder for the order."

Dealers aren't feeling any pinch from a short supply now, but they're worried. If business gets going full blast, they may find it tough to meet the demand.

Keep Old Machines . . . "The supply of late model machines in good condition isn't too hot; in fact, some are hard to find even in poor condition," a leading dealer told THE IRON AGE. "Users don't seem to be selling the older stuff off as they get new machines. Fast-changing defense production needs seem to keep the plants hanging on to old equipment for 'insurance' purposes. Lack of plant or storage space may force them to sell some of the used stuff."

Economy lines of new machinery haven't cut seriously into the used market. Dealers say they lose a deal "now and then." What will happen when the economy lines get known a little better? The used machinery dealers are wondering.

Move Production Tools . . . Production tools continue to move well, for replacement rather than expansion. There's good demand for lathes in late 1940's models. Milling machines continue in the "best seller" class.

Few good planers are available. They're needed for conversion to duplicators. Dealers are looking for models with at least 12-14-ft tables. Some planers are also wanted for conversion to skin millers.

Radial drills and boring machines are moving fairly well. Sheet metal equipment sales keep rolling merrily along in tune with the busy electronics and home building industries. But the supply is getting tight. Punch presses, brakes, and shears are in good demand by the home construction field.

Want Welding Equipment . . . Welding machines in the smaller sizes are riding along with the need for sheet metal machinery. But larger welders are crawling at a snail's pace.

In the San Francisco Bay Area, some dealers say business is fair, and others report "improvement, with almost all items selling better."

There's no demand for "junk stuff." Good lathes, milling machines, and the old standby 21-in. blacksmith drill are all moving well.

Seattle Business Slow . . . Good business and good used machinery are both lacking in the Seattle region. A check of dealers finds most of them claiming business below a year ago, as much as 5 to 15 pct.

Calls for good used machinery are increasing. There's stiffer competition for business in Seattle-area machine shops and metalworking plants. Buyers must get the most out of their machines in order to compete. So they're demanding good used machinery. Dealers are going east to find late-model equipment.

Discuss Defense Problems . . . At recent meeting between members of the machine tool industry and representatives of the Office of Defense mobilization and Business & Defense Services Admin. industry spokesmen advised that the industry should be given blanket initial draft deferment and top priority to prevent bottlenecks that delayed production in past emergencies.

City State

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
8' x ¾" Bertsch Initial Type Bending Roll—LATE
8' x ¼" Bertsch Initial Type Bending Roll
10' x ¾" Bertsch Initial Type Bending Roll
20' x 1" Hilles & Jones Pyramid Type Bending Roll

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Size 186
10' x ⅛" Dreis & Krump Size 209
12' x ⅛" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
Model B-173 Verson All Steel, Capacity 13'x¼"
Cincinnati All Steel Press Brake 10'x¾"

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H Trav-Lift	20' Span 220/440 A.C.
8 ton P&H Trav-Lift	23' Span 440 Volt A.C.
5 ton P&H	80' Span 220/3/60 A.C.
7½ ton Shepard-Niles	22' Span 220/3/60 A.C.
10 ton Shepard-Niles	45' Span 230 Volt D.C.
10 ton Harnischfeger	50' Span 220/3/60 A.C.
15 ton NOFT	45' Span 220/3/60 A.C.
15 ton Case	80' Span 220 Volt D.C.
15 ton P&H	97' Span 115 Volt D.C.
With 220/440 AC Generator Set	
25 ton P&H	60' Span 230 Volt D.C.
With 5 ton Auxiliary	
30 ton Whiting	60' Span 220 Volt D.C.
50 ton Niles	60' Span 220/3/60 A.C.
125 ton Cleveland	65' Span 220 Volt D.C.
With 2 Trolleys 62½ ton & 10 ton Aux.	

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100,000# Poole Draw Bench, Max. length of bar 30' With draw up to 4½" max. round

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1", 1¾" Acme
6" AJAX with Air Clutch
1", 1¼", 2¾", 3", 3½", 4", 5" Ajax
1¼", 4", 5" National
7½" National—Air Clutch

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Lee Wilson Annealing Furnace — Natural Gas Work Dimensions 42" Cntl, 96" Piling Height

FURNACE—HEATING
Rockwell Rotary Hearth Gas Fired Forge Furnace

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1 ton Whiting Hydro Arc, Top Charge
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10 ton Elec. Furnace Co. Arc Melting Furnace

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48" McKay—Rolls 2¾" Dia.
54" Aetna Standard 17 Rolls 4¼" Dia.
72" H & J 8 Rolls 4¾" dia.
72" Sutton, 23 Rolls 2¾" Dia.
76" Voss-Ungerer, 23 Work Rolls 2.165" Dia. Capacity 22 to 13 Gauge Mild Steel

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#35 U 6 Multislide Max. width of stock 4¼" by .060 Thick. Edgewise Stock Straightener

PLATE DUPLICATOR
Thomas Machine Mfg. Co. Plate Duplicator, Handles Plates 6' x 10'. Punch Capacity 6" Hole through ¾" Plate

PRESSES—HYDRAULIC
100 ton Southwark 4-Column, 14" Stroke Platen 18" x 24"
500 ton Wood 4 Columns, 24" Stroke, 72" x 96" Between Columns
1200 ton Birdsboro 4-Columns, 20" Stroke 30" x 36" Between Columns

PRESS—STRAIGHT SIDE
#307A Bliss Double Geared, 6" Stroke, Bed Area 30" x 42"

PRESSES—TRIMMING
No. 74½ Bliss 90 ton, 4" Stroke, 16½ Shut Height
No. 75½ Bliss 110 ton, 4" Stroke, 18" Shut Height
No. 87 Toledo 150 ton, Bed Area 44" x 27"

PUNCH & SHEAR COMBINATIONS
No. 20 Pels Ironworker, Capacity Punch 1-3/16"x1", Shear 2" Sq., 2½" Rd., Angles 6x6x⅝"
#2 Long & Allstatter Double End, Punch 1" x 1"
#5 Wickes Single End 42" Throat 1¼" x 1"
Style W Cleveland Single End, 60" Throat, 313 Ton With Attachment for Dishing Heads

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Torrington Tandem Flattening Mill with Edge Conditioning Rolls, Flattening Rolls 8" x 4"
7½" Stockel Four High Rolling Mill
8" x 12" Blake & Johnson Single Stand Two High
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12" x 18" Waterbury Farrel Temper Mill
12" x 16" Philadelphia 5-High Cold Rolling Mill
18" x 20" Lewis Two High Two Stand
30" x 36" Pocle Two Stand Two High

SHEARS—GATE
80" x ¾" Pels
90" x ⅜" Birdsboro
11' x ¼" Garrison

SHEARS—ANGLE
6x6x⅝" Hilles & Jones
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8/16" Quickwork Rotary Shear, 26" Throat
⅝" Kling #250, With Flanging Attachment
⅝" Quickwork Circle Shear 18" Throat, Circle Cutting Attachment

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10' x 3/16" Dreis & Krump, Motor Driven
72" x 12 Ga. Niagara #46-B
120" x 12 Ga. Niagara #510-B
120" x ¼" Niagara #810
150" x ⅜" Birdsboro

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24" Stamco Heavy Duty Slitter
30" Yoder Coil Slitting Line, Uncoiler & Recoiler
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No. 0 Medart Continuous Automatic Straightening Machine. Capacity ⅝" to 1⅛" Dia. Bars any length or up to 2" Tubing, Motor Driven
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5,000 lb. Olsen Hydraulic LaCap Universal
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3" Bar Yoder, table type, 1942.

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4' arm 13" col. Carlton radial, P.F., P.E.
9' arm 16" col. American radial, H.D.

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40" No. 16A2 Blanchard 2-spd. rotary, new 1946.
72" Hanchett 3-spd. rotary surface, new 1946.
6" x 18" Landis cyl., 30 deg. 4D, 1941.
10" x 90" Landis gap type cylindrical, new 1941.

LATHES
No. 5 Jones & Lamson ram type univ. turret (2) late.
14" x 6' Handey Toolroom, 1949.
12" x 30" Monarch Model C, new 1942.
15" x 30" Lipe Carbo-Matic, 1942.
24" x 48" Monarch Toolroom, 1942.
No. 5 Gisholt, Pro-Selector, univ., new 1942.

MILLS
1-12 & 2-18 Cincinnati production.
1-2-3-4-5-6 knee type plain & vertical.
No. 3B Brown & Sharpe, pl. horiz., 1942.
24" x 24" x 12' Ingersoll adj. rail planer type, 1945.
42" x 42" x 10' Ingersoll adj. planer type.
60" x 48" x 10' Ingersoll adj. rail planer type.
No. 2H K & T plain horiz., new 1942.

PRESSES
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105 ton No. 7½ Verson OBI (2) 1939.
100 ton No. 83C Toledo S.S., D.D., cushions.
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150 ton No. 12-1 Cleveland OBI, late type.
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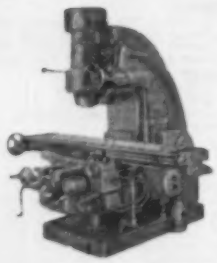

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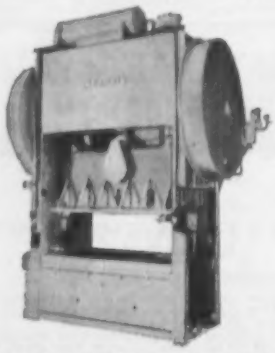

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2	1200	Whse.	720	600	2300
1	500	C.W.	720	275	2300/440
1	400	C.W.	1200	135/250	440
1	300	G.E.	720	275	2300
2	200	G.E.	720	250	2300/440
1	150	G.E.	720	250	2300/440
1	100	Whse.	900	275	2300
1	100	C.W.	1200	125	440/220
1	85	C.W.	1200	250	4000/2200

DIRECT CURRENT MOTORS 230-VDC

Qu.	HP	Make	Type	RPM
3*	3000	Whse.	Mill	600
1*	2000	Whse.	Mill	230/460
6*	1500	Whse.	Mill	600
4*	1200	Whse.	Mill	600
6*	800	Whse.	Mill	600
8	700	Whse.	Mill	285/700
1	350	G.E.	CD-169	1150
1	250	G.E.	MPC	325/975
1	200/250	G.E.	MPC	300/900
1	200	Whse.	Mill	300/1200
1	180	G.E.	MPC	400
1	90/166	G.E.	MPC	825/1125
1*	125	Whse.	SK-190	600
2	125	Whse.	SK-184	575/850
6	100	El. Dy.	30-S	450/1150
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1	15	Whse.	SK-93	575/1725
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4	10	Whse.	SK-91	250/1000

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Qu.	Kva	Make	Phase	Voltage
2	750	Pitts.	1	22,000-2300
3	667	Wagner	1	22,000/11,000-2300/4000
3	500	G.E.	1	22,000/11,000-2300/4000
3	333	G.E.	1	13,200-2300
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2	150	G.E.	3	2400/4150-240/480
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1	2000	Whse.	Mill	600	230/460
2	1500	Whse	Rev.	600	600
1	1400	G.E.	MCF	600	63/190
1	1200	G.E.	MCF	600	700/950
1	940	Whse.	QM	250	140/170
1	900	Whse.		250	450/550
1	525	Whse.		250	95/190
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	250	300/900
3	450	Whse.		600	415
1	250	G.E.	MPC	230	400/600
1	200	G.E.	1067PT	230	720
4	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CH-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	6SH	230	1150
3	150	Cr. Wh.	8SH-TEFC	230	880
1	150	Whse.	SK-151B	230	900/1800
1	150	Whse.	SK-201	230	860/950
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1	125	Whse.	SK-161	230	500/1500
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Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
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2	2500	G.E.	514	600	6600/13200
2	2000	G.E.	450	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	C.W.	514	30/115	4000/12000
1	1000	G.E.	900	250	6600
3	1000	G.E.	720	600	2300/4600
1	750	G.E.	720	275	2300/4600
1	750	C.W.	514	30/115	2300
1	600	G.E.	720	250	440/2300

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	5000	Whse.	OISC	3	2300x26400
1	2500	Whse.	OISC	3	26400/13200x440
3	2000	G.E.	HVDDJ	1	66000x13800
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	13800x2300

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ADVERTISERS IN THIS ISSUE

An asterisk (*) beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturers for your copies today.

A

*Alemite Div., Stewart Warner Corp. 139
Allis-Chalmers Mfg. Co. 68
*Alter Company 127
American Air Compressor Corp... 141
*American Brass Co., The 27
American Gas Association 52
American Steel & Wire Div., United States Steel Corp. 32
*American Welding & Mfg. Co., The 62
Armel, James P. 143
*Armstrong Bros. Tool Co. 150

B

*Baker Industrial Truck Div. of, The Baker-Raulang Co. 10
Baldwin-Lima-Hamilton Corp. .. 123
*Bath, Cyril Company, The 12
Belyea Co., Inc. 143
Benkart Steel & Supply Co. 146
Bennett Machinery Co. 142
Bethlehem Steel Co. 1
*Brainard Steel Div., Sharon Steel Corp. 55
Brillion Iron Works, Inc. 144
Brooks Equipment & Mfg. Co.... 100
Brownell, Hazard, Machine Tools, Inc. 142
*Brush Electronics Company 25
*Buda Divis'on, The Allis-Chalmers Mfg. Co. 73
Bullard Co., The 57

C

*Carboloy Dept. of General Electric Co. 26
*Carborundum Co., Abrasive Div. 18, 19
Cincinnati Gear Company, The... 114
*Cincinnati Milling Machine Co., The 60
Cleveland Steel Tool Co., The .. 148
Colorado Fuel & Iron Corp., The Wickwire Spencer Steel Div. ... 70
Columbia-Geneva Steel Div., United States Steel Corp. 32
Columbia Tool Steel Co. 117
Consolidated Vacuum Corp. Between Pages 68 & 69
Cowles Tool Co. 147
Crawford, F. H. & Co., Inc. 142
Crucible Steel Co. of America .. 16
Curry, Albert & Co., Inc. 143

D

Davidson Pipe Co., Inc. 144
Delco Products Div., General Motors Corp. 30, 31
Donahue Steel Products Co. 141
Dony, D. E. Machinery Co. 142
Dreis & Krump Mfg. Co. 150

E

Eastern Machine Screw Corp., The 148
Eastern Machinery Co., The 142
Electric Equipment Co. 143
ElectroLift, Inc. 149
Electro Manganese Co. 104
Enterprise Galvanizing Co. 148
Erie Foundry Co. 97
Espen-Lucas Machine Works, The 150
Expert Welding Machine Co. ... 137

F

Falk Machinery Co. 142
Federal Machine & Welder Co. .. 108
*Fischer Special Mfg. Co. 107
Foote Mineral Co. 11
Frank, M. K. 144

G

Gisholt Machine Co. Between Pages 16 & 17
Goodman Electric Machinery Co. 144
Goss & DeLeeuw Machine Co. ... 148
Gray, G. A. Company 103
Greenpoint Iron & Pipe Co., Inc. 144

(Continued on Page 148)

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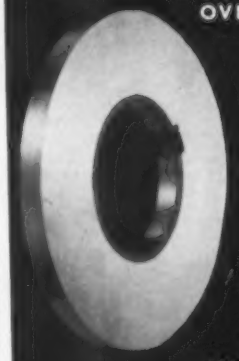

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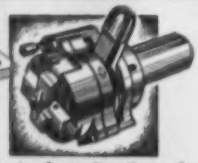
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ADVERTISERS IN THIS ISSUE

(Continued from Page 147)

Griffin Manufacturing Co. 149
Gulf Oil Corp. 76, 77
Gulf Refining Co. 76, 77

H

Halldén Machine Co., The 115
Hayward Company, The 137
Hendrick Manufacturing Co. 117
Henry, A. T. & Company, Inc. ... 141
Hewlett Construction Co., The ... 145
Hoskins Manufacturing Co. Inside Front Cover
Hughes, Arnold Co. 144, 145
Hyman, Joseph & Sons 142
Hyman-Michaels Co. 145

I

Industrial Renting Corp. 146
*Inland Steel Co. 79
Iron & Steel Products, Inc. 140

J

Jessop Steel Company Between Pages 36 & 37
Jones & Laughlin Steel Corp. Between Pages 68 & 69

K

Kasle Steel Corporation 145
Kinderman, Lou F. 142
*King, Andrew Co., The 147
Kline Iron & Metal Co., The 145
Knox, Earl E. Co. 142

L

LacLede Steel Co. 74
LacLede-Christy Co., Div. of H. K. Porter Co., Inc. 112
Land, L. J., Inc. 143
Lang Machinery Co. 143
Larrabee, Al 142
Lees-Bradner Co., The 29
Leland-Gifford Co. 150
*Lincoln Electric Co. 20, 21
*Lindberg Engineering Co. 110
*Link-Belt Co. 28
Lovejoy Flexible Coupling Co. ... 148
Lucas Machine Div., The New Britain Machine Co. Between Pages 32 & 33, 33, 34, 35
Luria Bros. & Co., Inc. 125

M

McNally, Pittsburgh Mfg. Co. ... 149
MacCabe, T. B. Co. 143
Malleable Founders' Society 106
*Manheim Mfg. & Belting Co. .. 135
Michigan Tool Co. 75
Midvale Company 58
Miles Machinery Co. 141
Monsanto Chemical Co., Organic Chemicals Div. 38
Montgomery Engineering Co. .. 145
*Morgan Engineering Co., The .. 98
Morrison Railway Supply Corp... 145

N

National Acme Co., The 96
National Business Bourse, Inc. .. 146
*National Forge & Ordnance Co. Between Pages 36 & 37
National Machinery Co. Between Pages 52 & 53
National Machinery Exchange ... 142
National Malleable & Steel Castings Co. 105
National Steel Corp. 17
National Tube Div., United States Steel Corp. 32
*New Britain Machine Co., The Between Pages 32 & 33, 33, 34, 35
New Departure Div., General Motors Corp. .....Front Cover
*New York & New Jersey Lubricant Co. 114
New York Rubber Corp. 144
Newport Steel Corp. 95
*North Carolina Dept. of Conservation & Development 13

(Continued on Page 150)

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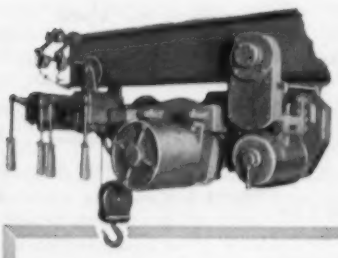

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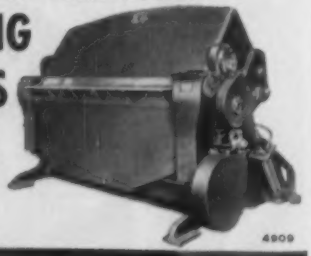

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ADVERTISERS IN THIS ISSUE

(Continued from Page 148)

O

O'Connell Machinery Co. 142
Osborn Mfg. Co., The 5

P

*Pangborn Corp. ..Inside Back Cover
Pennsylvania Salt Mfg. Co. Between Pages 68 & 69
Pierce Engineering Co. 145
Pittsburgh Plug & Products Co. .. 147
Platt Bros. & Co., The 147
Pollasky Engineering Co. 104
Purdy Company, The 144

R

*Republic Steel Corp. 14, 15
Research-Cottrell, Inc. 36
Roebling's, John A. Sons Corp. Between Pages 52 & 53
Ryerson, Jos. T. & Son, Inc. 6

S

Sargeant & Wilbur Heat Treating Corp. 150
*Sciaky Bros., Inc. 51
Service Steel Div., Van Pelt Corp. 150
*Sharon Steel Corp. 8
Shore Instrument & Mfg. Co., Inc., The 147
Standard Iron & Steel Co. 144
*Standard Pressed Steel Co. Between Pages 102 & 103
Standard Steel Works Div., The Baldwin-Lima-Hamilton Corp. . 123
Steel & Tube Div., The Timken Roller Bearing Co. .....Back Cover
*Stevens, Frederic B. 4
Stone, R. J. 143
Sun Oil Co. 66
Superior Tube Co. 118
Surface Combustion Corp. 22, 23

T

Tempil Corporation 9
Tennessee Coal & Iron Div., United States Steel Corp. 32
*Thomas Flexible Coupling Co. .. 116
Timken Roller Bearing Co., The Back Cover

U

*United Aircraft Products Inc. ... 72
United Engineering & Foundry Co. Between Pages 102 & 103
United States Steel Export Co. ... 32
United States Steel Corp. 32
United States Steel Supply Div., United States Steel Corp. 32
Universal Realty & Investment Corp. 146

V

Vanadium Corp. of America 99

W

Wallack Bros. 145
Wallingford Steel Co., The 109
Warner & Swasey Co. 138
Weirton Steel Co. 17
Weiss, B. M. Co. 144
Weiss Steel Co., Inc. 145
West Virginia Steel & Mfg. Company 144
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp. .. 70
Wigglesworth Industrial Corp. ... 142
Williams Machinery Company ... 143
Worcester Stamped Metal Co. .. 137
*Wysong & Miles Co. 24

Y

Youngstown Foundry & Machine Co. 65

CLASSIFIED SECTION

Business Opportunities 146
Clearing House 140-145
Contract Manufacturing Appears in first and third issue of each month. See Feb. 3 & Feb. 17
Employment Exchange 146
Wanted 145

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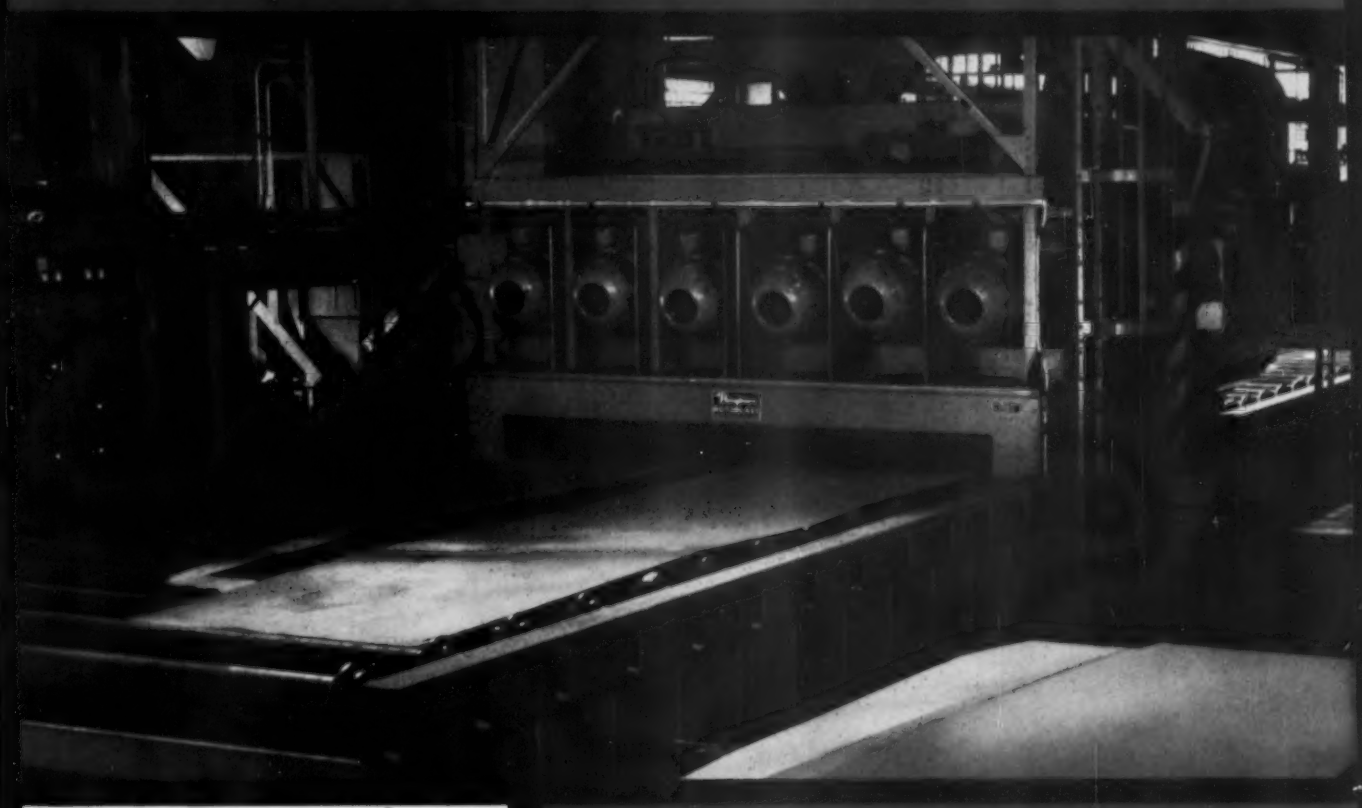

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